

# Exhibit J



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Dr. Howard Hu - Volume I

August 31, 2020

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Marc Czapla and Jill Czapla v. Republic Services,  
Inc., et al.

IN THE CIRCUIT COURT OF ST. LOUIS COUNTY  
STATE OF MISSOURI

MARC CZAPLA AND JILL )  
CZAPLA, )  
 )  
PLAINTIFFS, )  
 )  
vs. ) Case No. 18SL-CC00803-01  
 ) Division 4  
REPUBLIC SERVICES, INC., )  
ET AL., )  
 )  
DEFENDANTS. )

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BRIDGETON LANDFILL, LLC, )  
 )  
THIRD-PARTY )  
PLAINTIFF, )  
 )  
vs. )  
 )  
COTTER CORPORATION, N.S.L, )  
 )  
THIRD-PARTY )  
DEFENDANT. )

VIDEOTAPED REMOTE VIDEO CONFERENCING DEPOSITION OF DR.  
HOWARD HU  
TAKEN ON BEHALF OF THE DEFENDANTS  
AUGUST 31, 2020

Angela M. Taylor, RPR, IL-CSR, MO-CCR  
CSR No. 084.004538  
CCR No. 1067

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15 (Exhibits are attached to transcript.)

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1 APPEARANCES (CONT'D)

2 Attended Telephonically: Mr. Jonathan M. Soper of  
3 Humphrey, Farrington & McClain, P.C., 221 West  
Lexington Suite 400, Independence, MO 64050  
represented Plaintiffs.

4  
5 Attended Telephonically: Mr. Brian O'Connor Watson of  
6 Riley Safer Holmes & Cancila, LLP, 70 West Madison  
Street Three First National Plaza Suite 2900, Chicago,  
IL 60602 represented Third-Party Defendant Cotter  
Corporation (N.S.L.).

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1 IT IS HEREBY STIPULATED AND AGREED by and  
2 between counsel for the PLAINTIFFS and counsel for the  
3 DEFENDANTS, that this deposition may be taken in  
4 shorthand by Angela M. Taylor, a Registered  
5 Professional Reporter, Certified Shorthand Reporter  
6 and Certified Court Reporter, and afterwards  
7 transcribed into typewriting, and the signature of the  
8 witness is reserved by agreement of counsel and the  
9 witness.

10

11 0-0-0

12

13 VIDEOGRAPHER: We are on the record. This  
14 is the videotaped deposition of Howard Hu. Today's  
15 date is August 31st, 2020, and the time is 11:21 a.m.  
16 this is in the case of Marc Czapla and Jill Czapla  
17 versus Republic Services Incorporated, et al. Case  
18 No. 18SL-CC0080301 pending In The Circuit Court of  
19 St. Louis County, State of Missouri.

20 My name is Matthew Schnorf, the  
21 videographer. The court reporter is Angela Taylor.  
22 We are both with Pohlman USA Court Reporting.

23 Counselors, will you please state your  
24 appearance?

25 MR. SOPER: Jonathan Soper for the

EXAMINATION BY MR. BECK

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1 plaintiffs.

2 MR. BECK: Bill Beck for the defendant.

3 MR. WATSON: Brian Watson on behalf of  
4 third-party defendant, Cotter.

5 VIDEOGRAPHER: And will the court reporter  
6 please swear in the witness?

7 DR. HOWARD HU,  
8 of lawful age, being produced, sworn and examined on  
9 the part of the Defendants, and after responding "Yes,  
10 I do" to the oath administered by the court reporter,  
11 deposes and says:

12

13 \* \* \* \* \*

14

15 [EXAMINATION]

16 QUESTIONS BY MR. BECK:

17 Q Good morning, Dr. Hu. My name is Bill Beck.  
18 We met very briefly in Seattle about a year ago, but I  
19 don't expect you to remember that. I would appreciate  
20 it if you would simply pronounce your last name so I  
21 don't do it wrong.

22 A Sure. It's Hu, and can I just start off  
23 apologizing now for the technical delay, but I had an  
24 emergency dental procedure this morning. So if I'm  
25 slurring some of my words a little bit with a mouthful

1     **of Novocaine, just ask me to repeat it and I'll do the**  
2     **best I can.**

3           Q     We will and thank you for that.

4                     And what are you understanding to be the  
5     correct pronunciation of the plaintiff's last name?

6           A     **Czapla, I believe.**

7           Q     Thank you. Have you met Marc Czapla --

8           A     **No.**

9           Q     -- in person?

10          A     **No.**

11          Q     Have you spoken with him either by video or  
12     over the phone?

13          A     **No.**

14          Q     I take it you would never have actually  
15     conducted any sort of physical examination on Marc  
16     Czapla?

17          A     **I could have, but I didn't. I was not asked**  
18     **to do so.**

19          Q     Did you order any tests to be performed on  
20     Marc Czapla?

21          A     **No.**

22          Q     You have reviewed some medical records;  
23     correct?

24          A     **Yes.**

25          Q     And I'm going to refer to my paralegal

1 Melissa Love as Melissa because that's what I call her  
2 all the time. She's going to project the documents  
3 because I'm completely technically lacking.

4 MR. BECK: So Melissa, could you draw up  
5 Exhibit 1, please?

6 Q (By Mr. Beck) Dr. Hu, I understand you've  
7 been trained in how to use, unfortunately, our pandemic  
8 resource of Adobe Connect to be able to navigate in the  
9 document. Do you know how to do that?

10 A I don't believe I have control of the  
11 navigation. I think you guys would have to do that or  
12 somebody would.

13 Q All right. Well, we'll get you to the right  
14 page, and if you can't see something, let us know and  
15 we'll try to figure that out.

16 A Okay.

17 Q In paragraph 1 of Exhibit 1, your report,  
18 you start out by saying -- it's addressing Mr. Soper  
19 first, correct?

20 (Exhibit 1 was previously marked and  
21 now identified for the record.)

22 A Correct.

23 Q (By Mr. Beck) It says that you are writing in  
24 response to his request for a medical evaluation of  
25 Dr. -- Dr. Marc Czapla with respect to the potential

1 impacts of the exposures to radionuclides he may have  
2 experienced in association with the Westlake Landfill  
3 site on his subsequent development of cancer and any  
4 other adverse health outcomes. Have I read that  
5 accurately?

6 **A Yes.**

7 Q And in order to provide that evaluation, you  
8 have some medical records that you were provided by  
9 Jonathan Soper as one item, correct?

10 **A Correct.**

11 Q You also asked that Mr. Czapla prepare and  
12 provide to you a cancer history questionnaire so you  
13 can see what his -- his cancer history would be?

14 **A Yes.**

15 Q As you reviewed the notes -- or I'm sorry,  
16 as you reviewed the medical records that you were  
17 provided, you actually took some notes yourself for  
18 reference?

19 **A Yes.**

20 Q You were provided a dose calculation report  
21 prepared by Dr. James Clark. You were given that by  
22 Mr. Soper, correct?

23 **A Correct.**

24 Q And you conducted some literature review and  
25 provided some literature together with your report; is

1 that right?

2 **A Correct.**

3 MR. BECK: And Melissa, if we could go over  
4 to page 2, in the last paragraph which then carries  
5 over to page 3.

6 Q (By Mr. Beck) I've skipped a portion, Dr. Hu,  
7 but I'll come back.

8 You've got a section that starts out with  
9 the words this evaluation, in order to conduct this  
10 expert medical evaluation, I reviewed and relied upon  
11 the following documents and reports and then there's a  
12 brief list; is that accurate?

13 **A Yes.**

14 Q The first item on the list is a series of  
15 medical records, and of those medical records the  
16 first one that you reviewed were from the Baylor  
17 College of Medicine Ambulatory Service; is that right?

18 **A Correct.**

19 Q Melissa's going to pull up Exhibit 4 which  
20 was one of the sets of medical records produced to us  
21 by Mr. Soper as the ones you had reviewed. I'd ask  
22 you to just check Exhibit 4 and make sure that is --  
23 that appears and so that we're -- we -- we have to  
24 struggle with the means of taking your deposition  
25 because of the pandemic, but does that appear to be

1 the set of Baylor College of Medical -- I'm sorry,  
2 College of Medicine Ambulatory Service records that  
3 you reviewed and relied on?

4 (Exhibit 4 was previously marked and  
5 now identified for the record.)

6 **A Yes.**

7 Q (By Mr. Beck) Thank you. I'm going to go  
8 back and just read to you from Exhibit 1 in the same  
9 bullet. The next medical services provider records it  
10 says you reviewed are Baylor Clinic Section of  
11 oncology/hematology. And I'll ask Melissa to put up  
12 Exhibit 5, and, Dr. Hu, the question is do those appear  
13 to be the records that you reviewed from that provider?

14 (Exhibit 5 was previously marked and  
15 now identified for the record.)

16 **A In general, yes.**

17 Q (By Mr. Beck) Okay. I'm going to assume  
18 they're the accurate set because they were provided by  
19 Mr. Soper. The next set is excerpts of MD Anderson  
20 Cancer Center medical records, and I'll ask Melissa to  
21 put up Exhibit 6 and see if you can tell us if that's  
22 what those appear to be, the ones that you reviewed and  
23 relied on?

24 (Exhibit 6 was previously marked and  
25 now identified for the record.)

1           **A     Yes.**

2           Q     (By Mr. Beck) Thank you. The next is Tulane  
3     University Hospital and Clinic. And I'll ask Melissa  
4     to project Exhibit 7, Dr. Hu, so can tell us do those  
5     appear to be the records of Tulane Hospital and Clinic  
6     for Mr. Czapla that you reviewed and relied upon?

7                     (Exhibit 7 was previously marked and  
8                     now identified for the record.)

9           **A     Yes.**

10          Q     (By Mr. Beck) The next one is University of  
11     Missouri-Columbia Hospital and Clinic medical records,  
12     and I'll ask Melissa to project Exhibit 8. And the  
13     question, Dr. Hu, is does Exhibit 8 appear to be the  
14     records of University of Missouri-Columbia Hospital and  
15     Clinic that you reviewed and relied upon regarding  
16     Mr. Czapla?

17                     (Exhibit 8 was previously marked and  
18                     now identified for the record.)

19          **A     Can you -- can the -- yeah, can you scroll a**  
20     **little more? Keep going. I think so. It is a little**  
21     **vague, but I think that's consistent with what I**  
22     **reviewed.**

23          Q     (By Mr. Beck) All right. Thank you. You did  
24     provide or -- or informed Mr. Soper of which records  
25     you had reviewed so that he could produce an accurate

1 set; is that right?

2 **A Yeah. I mean, it's in the report.**

3 Q Sure. And then the last of the medical  
4 records, I got excerpts of UT Physicians' records, and  
5 I'll ask Melissa to project Exhibit 9, and, Dr. Hu,  
6 the question again is do these appear to be the  
7 records of UT Physicians in Houston that you reviewed  
8 and relied upon?

9 (Exhibit 9 was previously marked and  
10 now identified for the record.)

11 **A Yes.**

12 Q (By Mr. Beck) And so far as you know, is that  
13 all of the medical records of Mr. Czapla that you have  
14 reviewed?

15 **A I believe so.**

16 Q Are there any med -- medical records for  
17 Mr. Czapla that you have reviewed that cover his life  
18 prior to -- let me say that a better way.

19 Dr. Hu, are there any medical records for  
20 Mr. Czapla that you have reviewed that are dated  
21 before 2006?

22 **A Not that I recall.**

23 Q And you know that the alleged exposure in  
24 this case is said to have occurred between the years  
25 of 1973 and 1978, do you not?

1           **A     Correct.**

2           Q     Did you request any records that were more  
3 contemporaneous to the time frame 1973 to 1978?

4           **A     Not specifically. I assumed that I was**  
5 **given the records that are relevant to this case.**

6           Q     But you didn't make any requests for any  
7 medical records, though, other than what counsel  
8 handed you?

9           **A     Correct.**

10          Q     Now, going back to Exhibit 1.

11               MR. BECK: Melissa, if you can go back to  
12 that same list on page 2 carrying over to the top of  
13 page 3 to the second bullet about the questionnaire.

14          Q     (By Mr. Beck) Dr. Hu, is it correct --

15          **A     I'm sorry.**

16          Q     I'm sorry?

17          **A     I'm sorry. I -- I need to correct myself.**  
18 **I did ask counselor whether there's any records of**  
19 **diagnostic x-rays taken prior to 2006.**

20          Q     And why did you want to know that?

21          **A     Just so I can understand what other**  
22 **radiation exposure Mr. Czapla might have had.**

23          Q     Is an x-ray ionizing radiation?

24          **A     Yes.**

25          Q     Would a CT scan be ionizing radiation?

1           **A     Yes.**

2           Q     Would an MRI be ionizing radiation?

3           **A     No.**

4           Q     Now, let's go back into Exhibit 1, please,  
5     if we could, on page 2 carrying over to the top of  
6     page 3. The second bullet refers to a questionnaire.

7                     MR. BECK: Melissa, do you have that  
8     projected?

9                     MS. LOVE: Do you want the questionnaire,  
10    Bill?

11                    MR. BECK: No. I just want you to put up  
12    Exhibit 1 note the bullet?

13                    MS. LOVE: Yes.

14                    MR. BECK: Thank you.

15           Q     (By Mr. Beck) Dr. Hu, the next thing that you  
16    received and reviewed and relied on to write your  
17    report Exhibit 1 is a questionnaire that was filled out  
18    by Marc Czapla?

19           **A     Correct.**

20                    MR. BECK: And, Melissa, if you could  
21    project Exhibit 10 so that we can have Dr. Hu identify  
22    that questionnaire, if he can. And let me know when  
23    it's showing, please, because I can't see the screen.

24                    MS. LOVE: It's showing, Bill.

25                    MR. BECK: Thanks.

1 Q (By Mr. Beck) Dr. Hu, is Exhibit 10 the  
2 family cancer history questionnaire that you received  
3 from Marc Czapla and relied on to write your report?

4 (Exhibit 10 was previously marked and  
5 now identified for the record.)

6 A I believe so.

7 Q (By Mr. Beck) Thank you.

8 MR. BECK: Going back to Exhibit 1, Melissa,  
9 to the third bullet.

10 Q (By Mr. Beck) Dr. Hu, the third bullet in the  
11 list of things that you reviewed and relied upon is a  
12 transcript of Marc Czapla's deposition given June 24,  
13 2020. Do you see that bullet?

14 A I do.

15 MR. BECK: And, Melissa, if you could,  
16 project Exhibit -- I believe it's 13, and let me know  
17 when it's up.

18 MS. LOVE: It's up.

19 MR. BECK: Thank you.

20 Q (By Mr. Beck) And, Dr. Hu, the report said  
21 June 24th. The deposition were projecting actually  
22 says July 24, 2020, but with that correction, is  
23 Exhibit 13 the deposition of Marc Czapla that you  
24 reviewed and relied upon in writing your report?

25 (Exhibit 13 was previously marked and

1 now identified for the record.)

2 **A I believe so.**

3 Q (By Mr. Beck) Thank you.

4 MR. BECK: Melissa, if you can go back to  
5 the bullet list in Exhibit 1 now, please, the final  
6 item.

7 MS. LOVE: I'm there, Bill.

8 MR. BECK: Thank you.

9 Q (By Mr. Beck) Dr. Hu, could you look at  
10 Exhibit 15 and see if that appears to be the exposure  
11 assessment conducted by Clark and Associates  
12 Environmental Consulting, Inc. and dated April 16,  
13 2020, that you reviewed?

14 MR. SOPER: August 16, Bill.

15 MR. BECK: I'm sorry. Thank you for that  
16 correction.

17 Q (By Mr. Beck) Is it -- Is that what it is  
18 with that correction, Dr. Hu?

19 (Exhibit 15 was previously marked and  
20 now identified for the record.)

21 **A Yes.**

22 Q (By Mr. Beck) And are those all of the items  
23 that you were given about this case to review and rely  
24 upon in preparing this report apart from your own  
25 knowledge and literature review?

1           **A     Yes.**

2           Q     Did you at any time speak with Jill Czapla,  
3     the other plaintiff?

4           **A     No.**

5           Q     Did you at any time speak with Dr. James  
6     J.J. Clark who wrote Exhibit 15 with respect to this  
7     case?

8           **A     No.**

9           Q     Did you review the deposition recently given  
10    by Dr. Clark concerning his own exposure assessment?

11          **A     Yes.**

12          Q     So that is another item that you reviewed at  
13    his deposition testimony?

14          **A     Yes. It was actually after I finished my**  
15    **report so it was very recently.**

16          Q     All right. And other than the deposition  
17    testimony of James Clark, is there anything else that  
18    would amend the list of items that you reviewed and  
19    relied upon to prepare your own report?

20          **A     No.**

21               MR. BECK: Now, if we could project Exhibit  
22    11, please, Melissa.

23               MS. LOVE: It's there, Bill.

24               MR. BECK: Thank you.

25          Q     (By Mr. Beck) Dr. Hu, is this a set of notes

1 that you prepared as you reviewed the medical records  
2 of Marc Czapla prior to writing your report?

3 (Exhibit 11 was previously marked and  
4 now identified for the record.)

5 **A Yes.**

6 Q (By Mr. Beck) Thank you.

7 MR. BECK: And if we can go back to Exhibit  
8 1 and go to the same spot, should be top of page 3 by  
9 now right after the fourth bullet.

10 MS. LOVE: We're there, Bill.

11 MR. BECK: Thank you.

12 Q (By Mr. Beck) Dr. Hu, you then say in  
13 addition, I relied upon the peer-reviewed scientific  
14 literature that, in my opinion, is the most rigorous  
15 and relevant to the issues inherent in this evaluation.  
16 As appropriate, such evidence will be cited during the  
17 course of this report. Have I read that accurately?

18 **A Yes.**

19 Q And is that literature, in fact, cited  
20 within the report generally within footnotes?

21 **A Yes.**

22 Q And did you provide copies of that  
23 literature to Mr. Soper so that they can be produced  
24 to this deposition together with your report?

25 **A Yes.**

1 MR. BECK: Melissa, if I can ask you to  
2 project Exhibit 1 and go to page 4 at the top first  
3 partial paragraph.

4 MS. LOVE: We're there, Bill.

5 Q (By Mr. Beck) Dr. Hu, you refer in your  
6 report in this paragraph to an operation that Marc  
7 Czapla had; is that correct?

8 A Yes.

9 Q Was that the operation that occurred on  
10 February 12, 2013?

11 A I don't remember the date, but I can look at  
12 my copy of the report that I have in my hand, so if  
13 you don't mind --

14 Q That would be fine.

15 A Okay.

16 Q And I do want you to feel free to consult  
17 your report any time you need to to give good answers.

18 A Okay. Thank you. Yes, the operation  
19 occurred, as far as I know from review of medical  
20 records, on February 12th, 2013.

21 Q And so was a tumor found in one of  
22 Mr. Czapla's kidneys and removed?

23 A Yes.

24 Q Did it appear to you from the operative  
25 reports and other materials that the surgeon was able

1 to attain these margins?

2 **A Yes.**

3 Q Was there also a biopsy taken from the other  
4 kidney in order to determine whether it had cancer  
5 cells present?

6 **A I'm not sure what was done to determine if**  
7 **it was cancer or not, but a biopsy was taken of the**  
8 **other kidney.**

9 Q And all -- a biopsy was taken of the  
10 non-cancerous kidney, and one of the things that it  
11 revealed was interstitial fibrosis; is that correct?

12 **A Correct.**

13 Q What is interstitial fibrosis?

14 **A It's basically some scarring.**

15 Q Is it a formation of fibrous tissue?

16 **A Yes.**

17 Q And what causes kidney scarring or this  
18 interstitial fibrosis?

19 **A Well, there's a whole long list of things,**  
20 **but in the presence also of the calcification, I think**  
21 **one of the questions is whether this might have been**  
22 **related to an early kidney stone, but, you know,**  
23 **there's a whole long list of things that can cause**  
24 **that, infection, connective tissue disorders, et**  
25 **cetera.**

1           Q     If a patient were to regularly take  
2     substantial amounts of nonsteroidal anti-inflammatory  
3     drugs, could that cause interstitial fibrosis of the  
4     kidneys?

5           A     Well, I'm not sure that anti-inflammatories  
6     do interfere with --

7                     (The phone line cut out, and the court  
8                     reporter asked for clarification.)

9           A     Yeah, let me just revise that. So the  
10    question was -- I'm sorry. Can you repeat the  
11    question, Counselor?

12          Q     (By Mr. Beck) Sure. Can we have an acronym  
13    for a nonsteroidal anti-inflammatory drug? How do you  
14    pronounce it? NSAID?

15          A     NSAIDs.

16          Q     NSAID. Can NSAIDs cause interstitial  
17    fibrosis of the kidney?

18          A     I'm not sure. I think I'd have to go back  
19    to my literature sources to check on that.

20          Q     Can NSAIDs cause chronic kidney disease?

21          A     They can definitely cause some kidney  
22    malfunction, whether it can actually result in chronic  
23    renal failure is debatable.

24          Q     When you reviewed the medical record that  
25    created your notes, do you recall, first of all, when

1 that was?

2 **A When what was?**

3 Q When did you review the medical records and  
4 create the notes I showed you that were marked as  
5 Exhibit 11?

6 **A Some time in the last two or three weeks.**

7 Q Thank you. When you reviewed the medical  
8 records, did you look, among other things, for  
9 evidence that Mr. Czapla was taking or had taken  
10 frequent NSAIDs?

11 **A I do recall there was some evidence of that.**

12 Q And was that remarkable to you for any  
13 reason?

14 **A Well, as far as I know, NSAIDs are not a  
15 risk for renal cell carcinoma, so no.**

16 Q Radiation aside, what are some of the risks  
17 for renal cell carcinoma? Or let's say radioactivity.

18 **A Yeah. Smoking is one. There's a number of  
19 familiar -- familial hereditary cancers that are  
20 another risk factor. There are some other conditions  
21 that are associated with, although the causal  
22 mechanistic pathway is unclear. Things like obesity  
23 and hypertension.**

24 Q What about diabetes?

25 **A Well, that's part of the metabolic syndrome**

1 complex which has been associated with a somewhat  
2 elevated risk in some studies along with obesity.

3 Q Any other risk factors for renal cell  
4 carcinoma, radioactivity aside, aside the ones you  
5 listed that are relevant to this case?

6 A There have been some chemicals that have  
7 been associated with elevated risk of kidney cancer  
8 like trichlorethylene. And then, of course, even  
9 without any of the known hereditary familial cancers  
10 like Cowden syndrome, just having a family history of  
11 kidney cancer is a risk factor.

12 Q Did you look up the background incidence of  
13 kidney cancer to come up with a value for that?

14 A I have it somewhere. I didn't quote it in  
15 this report. You're talking about the lifetime risk  
16 of developing kidney cancer?

17 Q Yes.

18 A Yeah, I can't -- I come across that  
19 statistic, but I can't remember right now. Something  
20 like one out of 42 or 45, something like that.

21 Q One out of 42 or 45?

22 A Yeah, I'm just speculating right now because  
23 I can't remember the exact number.

24 Q And if you wanted to look it up and confirm  
25 it, where would you look?

1           **A     I would either look at any of my textbooks**  
2   **by Harrison Principles of Internal Medicine or**  
3   **American Cancer Society website or something like**  
4   **that.**

5           Q     And among -- well, let -- let's go back to  
6   one of the risk factors that you mentioned for renal  
7   cell carcinoma and that is exposure to  
8   trichlorethylene or TCE. Is it correct that TCE has  
9   been historically a frequently used solvent not only  
10   for industrial applications but also by people working  
11   in their garage?

12           MR. SOPER: Objection. Calls for  
13   speculation.

14           Q     (By Mr. Beck) Am I correct, Dr. Hu?

15           **A     TCE has primarily been an industrial**  
16   **solvent. I couldn't tell you whether it was**  
17   **frequently used as a consumer product by -- you know,**  
18   **in non-industrial applications.**

19           Q     You haven't researched that, or you  
20   researched it and don't remember, or you think I'm  
21   wrong?

22           **A     I just don't recall.**

23           Q     If I tell you that TCE historically was the  
24   most commonly used solvent in the 1970s in the United  
25   States, would you know if that was accurate or

1 inaccurate without doing research?

2 MR. SOPER: Foundation.

3 A Commonly used solvent in industry or for  
4 domestic use?

5 Q (By Mr. Beck) Domestic. Household use.

6 A I think I would be skeptical of that. I  
7 mean, alcohol and isopropyl alcohol probably was used  
8 much more frequently than trichlorethylene for  
9 domestic use.

10 Q As a solvent?

11 A Yes, as a solvent. It's a solvent, yes.

12 Q (By Mr. Beck) What do you know it is used --

13 A The definition of a solvent is one that can  
14 basically dissolve fats in particular, so yeah, the  
15 alcohol family of compounds are considered solvents.

16 Q That's great but let's go back to  
17 trichloroethylene for a moment. Do you know any of  
18 the household uses for that?

19 A You know, I imagine as a degreaser for  
20 people working on their carburetor or something like  
21 that, but I haven't reviewed that recently.

22 Q Did you pose to Mr. Czapla some place the  
23 inquiry of whether or not he used TCE or was around  
24 when TCE was used in a home where he lived or say in  
25 the garage?

1           **A     No, I did not.**

2           Q     Among the risk factors you gave me, can you  
3     give me a ranking of which are the risk factors among  
4     the smoking, hereditary, obesity, and I'm going to  
5     say, slash, metabolic syndrome, slash, diabetes,  
6     hypertension and TCE exposure?

7           **A     Give you a ranking in terms of --**

8           Q     Risk. Which are associated with the most  
9     cancers or -- and I'm going to be specific to renal  
10    cell carcinoma.

11          **A     I can't do that today sitting in front of**  
12    **you, no.**

13          Q     If you wanted to find out what the lifetime  
14    excess cancer risk for a smoker or for someone with a  
15    family history of kidney cancer or for a person who  
16    has obesity, metabolic syndrome, and diabetes, or for  
17    a person who is hypertensive and has been for a long  
18    time, where would you look that up in order to attach  
19    numerical significance to a risk factor?

20          **A     That's a tough one. I think, you know, you**  
21    **could review the literature, but I'm not sure those**  
22    **statistics are readily available -- lifetime risk. It**  
23    **could be a lot of epidemiology studies that look at**  
24    **risk, but given the period of observation that -- you**  
25    **know, that was -- in which the epidemiologic study**

1 occurred, I'm not sure I can give you a ranking of  
2 that nature in which all the risk factors you just  
3 mentioned were studied in the same epidemiology study  
4 and, therefore, comparable in terms of comparative  
5 risk.

6 Q Prior question. This isn't a ranking  
7 question. This is if I wanted to put numbers to them  
8 question, would I look at epidemiology studies and see  
9 if I can get it there?

10 A That would be the right place, yes, and even  
11 as epidemiology studies -- you know, the data is as  
12 good as what the exposure measures are for each of  
13 these risks and for something like trichloroethylene,  
14 it's difficult.

15 Q Is that because it's so ubiquitous?

16 A No, it's because most people couldn't really  
17 tell you exactly how much they used or how much they  
18 were exposed to, et cetera.

19 Q And if you wanted to look up any of the  
20 associating smoking with renal cell carcinoma, is  
21 there any particular literature source that you start  
22 with?

23 A Yeah, there was -- you know, there's  
24 abundant research. Smoking and cancer, I think you'd  
25 be looking at any of those longitudinal and cohort

1     **studies to understand what the risk is.**

2                   **And there might be some reviews or**  
3     **metanalyses. Those are the kinds of studies that**  
4     **would give you a more consistent and overall**  
5     **appreciation of what the associated risk might be.**

6           Q     And a metaanalysis is helpful because it  
7     looks at more than one study and more than one  
8     population. It looks across studies to try to come to  
9     conclusions based on essentially the whole body of  
10    literature?

11           A     **Correct.**

12           Q     With respect to the relationship between  
13    family history or hereditary and renal cell carcinoma,  
14    if you wanted to try to come up with a way to quantify  
15    that risk, where would you look?

16           A     **In any of the reviews that are associated**  
17    **with these familial cancers. Oncologists have been**  
18    **studying these syndromes for some time.**

19           Q     And isn't it true that obesity is a risk  
20    factor for renal cell carcinoma whether or not the  
21    person has diabetes as well?

22           A     **That has been seen in some epidemiology**  
23    **studies, yes.**

24           Q     With respect to hypertension, is chronic and  
25    significant hypertension -- let me ask you a better

1 question.

2 With respect to hypertension, if you wanted  
3 to determine the degree of association between  
4 hypertension and renal cell carcinoma, would you,  
5 again, look for epidemiology studies and especially  
6 metanalyses?

7 **A Yes.**

8 Q And with respect to people who have a  
9 metabolic syndrome and particularly diabetes, is there  
10 a strong association between that and renal cell  
11 carcinoma?

12 **A Depends how you define strong.**

13 Q I'll let you do it and then you can tell me  
14 how you got there.

15 **A I would say there's an association. It's  
16 been seen in some studies but not others and I'll just  
17 leave it at that.**

18 Q But it's your belief today, based on the  
19 literature that you reviewed, that a person with  
20 diabetes has a higher risk of renal cell carcinoma  
21 than a person without diabetes, correct?

22 **A I believe that has been seen in several  
23 studies and it's probably true.**

24 Q And if you wanted to try to quantify that  
25 risk in order to compare it to some other risk, would

1 you, again, look for epidemiology studies or  
2 metanalyses studies to see if they helped?

3 **A Correct.**

4 Q Now, let me go back to Exhibit 1, your  
5 report.

6 MR. BECK: And, Melissa, if you can project  
7 it on page 4 so that the bottom half of the page is  
8 capable of being viewed, please.

9 MS. LOVE: It's there, Bill.

10 MR. BECK: Thank you.

11 Q (By Mr. Beck) Dr. Hu, there's one other thing  
12 I neglected to ask you, and that is in addition to the  
13 transcript of the deposition of Marc Czapla that you  
14 reviewed and described in your report, have you  
15 reviewed a second day transcript of his deposition?

16 **A I don't know.**

17 Q Well, do you know of any transcript other  
18 than the July 24th, 2020, transcript of a deposition  
19 of Marc Czapla that you have read?

20 **A No.**

21 Q Has Mr. Soper or anyone else described to  
22 you any testimony by Marc Czapla in a second day of  
23 deposition?

24 **A Mr. Soper relayed to me when I asked about**  
25 **the diagnostic x-rays that Mr. Czapla couldn't**

1     remember, you know, whether he had, for instance,  
2     pediatric dental x-rays or not. That's what I recall  
3     of the conversation, and whether that showed up in his  
4     secondary deposition, I don't -- I don't know. I  
5     don't recall.

6           Q     But you didn't have any discussion with Mr.  
7     Soper specifically about a second day of deposition?

8           A     No.

9           Q     You assume, don't you, that Mr. Czapla had  
10    pediatric x-rays of his teeth?

11          A     I think, yeah, that's common experience for  
12    all children so I wouldn't be surprised. I just -- I  
13    just don't know.

14          Q     And if one were to desire to quantify the  
15    millirem exposure for the lifetime excess cancer risk  
16    from dental x-rays, where would one look for that?

17                MR. SOPER: Object to form. Incomplete  
18    hypothetical.

19          A     I mean, there's all sorts of bodies that  
20    have quantified the usual amount of radiation  
21    associated with dental x-rays. You go to ICRP,  
22    American Dental Association, the Society for Radiology  
23    Protection. I'm sure they all have some aspect of  
24    that.

25          Q     (By Mr. Beck) And, again, pediatric x-rays

1 like other x-rays are ionizing radiation?

2 **A Yes.**

3 Q And people typically make the decision  
4 voluntarily to expose themselves to that radiation  
5 because it's helpful to see if your teeth have  
6 problems?

7 **A Right, and typically, you know, pediatric**  
8 **x-rays are also shielded so that other parts of the**  
9 **body besides the mouth, like the kidneys, are not**  
10 **exposed.**

11 Q Right. They put the -- the lead apron over  
12 your body so that only your head gets zapped, right?

13 **A That's right.**

14 Q Are you one of the people who believe that  
15 cell phone use causes exposure to radiation that  
16 potentially can contribute to cancer?

17 **A I don't have an opinion on that.**

18 Q Have you ever testified either way on that  
19 subject in any lawsuit?

20 **A No.**

21 Q Have you ever written a report on that  
22 subject either way in any lawsuit?

23 **A No.**

24 Q Is the radiation emitted from a cell phone  
25 held up to one's ear ionizing radiation?

1           **A     Can you repeat that question, again?**

2           Q     Sure. Is the radiation emitted by a cell  
3     phone held up to one's ear during use ionizing  
4     radiation?

5           **A     One year of use did you say?**

6           Q     No, I didn't say that. And I apologize. Be  
7     sure and catch me if I say something and you're not  
8     sure you got it because --

9           **A     Yeah, I am.**

10          Q     I'm sorry, I'm working from home like  
11     everybody else in a place where the air conditioning  
12     compressor is in the process of replacement.

13          **A     Okay.**

14          Q     And, therefore, I'm kept alive -- since it's  
15     over 100 degrees, I'm being kept alive by a window  
16     unit, and if it makes too much noise so forgive me and  
17     I'll repeat anything.

18                 That said, the question is: When a person  
19     uses a cell phone to talk, holds it up to the ear,  
20     does that expose the person to ionizing radiation?

21          **A     No, not that I'm aware of.**

22          Q     Does it expose the person to nonionizing  
23     radiation?

24          **A     If it is, it's a very small amount.**

25          Q     Sure. So let's look in your report on page

1 4, bottom half. There's a section of your report  
2 titled, Estimates of Radiation Exposure Specific to  
3 Marc Czapla; is that correct?

4 **A Yes.**

5 Q The first paragraph, I'm just going to read  
6 it for the record. It's not that long and I've got a  
7 simple question about it. It says, I have relied on  
8 the August 16, 2020, exposure analysis expert report  
9 on Marc and Jill Czapla, plaintiffs, produced by Clark  
10 and Associates for estimate of radiation exposures by  
11 Dr. Czapla in connection with the Westlake Landfill's  
12 site. As noted by the Clark report, based on its  
13 review of the evidence, during 1973, approximately  
14 8,700 tons of leached barium sulfate containing  
15 approximately 7 tons of U308 were mixed with  
16 approximately 39,000 tons of soil at the Latty Avenue  
17 site. The leached barium sulfate contained between  
18 0.05 percent and 0.1 percent uranium as U308. The  
19 residue soil mixture was transported to the Westlake  
20 Landfill and deposited on site. The radioactive  
21 material consists of primarily of uranium, U238, and  
22 thorium, TH 230 and radium, RA 226. The soil came  
23 from decontamination efforts at the Cotter  
24 Corporation's Latty Avenue plant in Hazelwood where  
25 the material had been stored at the time that

1 Dr. Czapla was visiting the landfill, especially  
2 during 1973, the radioactive materials would have been  
3 near or on the surface of the landfill.

4 First of all, I tried, did I read that  
5 accurately?

6 **A You did.**

7 Q And did that entire paragraph come from the  
8 Clark report? Is that the source of that information?

9 **A Yes. I don't recall if it was verbatim, but**  
10 **it was taken directly from his report.**

11 Q I want to go to the sentence that says at  
12 the time that Dr. Czapla was visiting the landfill  
13 especially during 1973, the radioactive materials  
14 would have been near or on the surface of the  
15 landfill. My question is, what do you remember about  
16 why Dr. Clark theorized that would especially be true  
17 during 1973?

18 **A Well, I recall him taking the history that**  
19 **that's the year that Marc Czapla began to play on**  
20 **that -- at that site.**

21 Q Right. But why would the materials be near  
22 or on the surface of the landfill more in that year  
23 than in any other?

24 **A Well, I don't recall the specifics, but you**  
25 **know, after deposition, that's when, you know,**

1     **you'll -- everything's fresh, and then there's erosion**  
2     **and those factors that tend to especially over time**  
3     **dilute whatever is on the surface.**

4           Q     Okay. Anything else you remember about  
5     Dr. Clark's theory that especially during 1973 the  
6     radioactive materials would have been near or on the  
7     surface of the landfill?

8           MR. SOPER: Object to the form.

9           **A     Not -- not that I recall.**

10          Q     (By Mr. Beck) Thank you. The next paragraph  
11     states -- this is in your report Exhibit 1 states based  
12     on testimony supplied by Dr. Czapla, he played at the  
13     Bridgeton Landfill, in parentheses you say Westlake  
14     Landfill, during the summers and weekends from 1973  
15     through 1978, in parentheses you say age 8 through age  
16     13. According to Dr. Czapla, he and two friends would  
17     visit the landfill several times per week and would  
18     stay for several hours during each visit. The boys  
19     would play in the dirt, search through the trash, and  
20     watch the bulldozers and trucks working on site.

21                  Have I read that accurately?

22           **A     Yes.**

23          Q     If I refer to written question answers to  
24     questions that are called interrogatories in a  
25     lawsuit, do you know generally what that refers to?

1           **A     Yes.**

2           Q     Did you review or were you given excerpts  
3     from interrogatory answers prepared by counsel and  
4     supplied by Marc Czapla?

5           **A     Not -- not that I recall.**

6           Q     Do you know if the wording of this paragraph  
7     of your report matches the wording of one of the  
8     interrogatory answers signed by Marc Czapla?

9           **A     I have no idea.**

10          Q     Am I correct, sir, that the years 1973  
11     through 1978 are the only years in which you have any  
12     information that Marc Czapla was exposed to  
13     radioactive material at the landfill?

14          **A     That's what I recall.**

15          Q     Do you have any information about whether  
16     Mr. Czapla -- I'm sorry, whether Marc Czapla or  
17     Dr. Czapla -- let me -- let me straighten that out.  
18                 You refer to Dr. Czapla throughout your  
19     report, correct?

20          **A     Yes.**

21          Q     He's not a medical doctor like you, but he's  
22     a PhD so you call him Dr. Czapla, true?

23          **A     Correct. Out of respect.**

24          Q     If I -- if I fail to, please don't take it  
25     as a sign of disrespect. Take it as a sign of I talk

1 about a plaintiff in a lawsuit by his name, and I  
2 haven't met the gentleman.

3 So going back to your report, you say that  
4 Dr. Czapla played at the landfill during summers and  
5 weekends from when he was 8 until he was 13, and you  
6 confirmed, I think, that there's no time before or  
7 after that that you're aware of that he played at the  
8 landfill?

9 **A Not that I recall.**

10 Q Now, for this material that was brought to  
11 the landfill from the Latty Avenue property, we're  
12 talking about some 47,700 tons of material, according  
13 to your best information; is that correct?

14 **A Right.**

15 Q Do you know how long it took to truck that  
16 material to the landfill?

17 **A I don't know.**

18 Q Do you know when in 1973, what month or  
19 months, that material was trucked to the landfill?

20 **A No.**

21 Q Do you know whether or not Dr. Czapla claims  
22 he was playing on the landfill at the very same time  
23 as the trucks were bringing in that material and  
24 dumping it on the ground?

25 **A I don't know.**

1           Q     Do you have any information about during  
2     what month in 1973 Dr. Czapla says he was playing on  
3     the landfill?

4           **A     No.**

5           Q     Going back to the paragraph describing when  
6     Dr. Czapla says he played in the landfill, is that  
7     paragraph based entirely on the July 24, 2020,  
8     deposition of Marc Czapla?

9           **A     I think it's actually based on the report**  
10          **prepared by James Clark and Associates.**

11          Q     All right. Based on the information that  
12     you've been provided, does Dr. Czapla claim he went to  
13     the landfill even in the winter when the ground was  
14     frozen and it was snowing in St. Louis County?

15          **A     I don't know.**

16          Q     Were there whole months or seasons of the  
17     year during which Dr. Czapla was not present at the  
18     landfill between 1973 and 1978?

19          **A     I don't know.**

20          Q     Based on his description about playing in  
21     the dirt, searching through the trash, and watching  
22     bulldozers and trucks working, do you have any  
23     information based upon which you conclude that he did  
24     so when the ground was frozen?

25          **A     No. I relied on the exposure assessment by**

1     **Clark and Associates.**

2           Q     But you haven't independently evaluated  
3     whether the number of days of exposure Dr. Clark uses  
4     as the basis for his calculation is or is not an  
5     accurate expression of Mr. Czapla's testimony?

6           A     **I do not have an opinion on that.**

7           Q     And what you've done is taken Dr. Clark's  
8     numbers then and relied on them in toto so that if  
9     he's got an error in them, it translates into your  
10    adoption of his calculation?

11           MR. SOPER:   Object to form.

12          A     **Yes.**

13          Q     (By Mr. Beck) When in 1978 did Dr. Czapla  
14    stop going to the landfill?

15          A     **I don't know exactly.**

16          Q     Why in 1978 did Dr. Czapla stop going to the  
17    landfill?

18          A     **I recall reading in James Clark's reports  
19    that he engaged in some other activity instead.**

20          Q     Was it racquetball?

21          A     **I think that was mentioned.**

22          Q     Was it the Bridgeton Municipal Athletics  
23    Complex?

24          A     **That I don't recall.**

25          Q     During the period he says he went to the

1 landfill, do you have any understanding why Dr. Czapla  
2 between the ages of 8 and 13 decided playing in the  
3 dirt of the landfill was more fun than playing at  
4 Bridgeton Municipal Athletic Complex which was closer  
5 to his home?

6 **A I have no information of that.**

7 Q Do you know of any human being on earth able  
8 to corroborate Marc Czapla's claim that he played at  
9 the Westlake Landfill between 1973 and 1978?

10 MR. SOPER: Object to form.

11 **A No.**

12 Q (By Mr. Beck) Have you seen any -- like a  
13 contemporaneous record, a photograph, an affidavit of a  
14 corroborating witness, or anything other than Marc  
15 Czapla's testimony and Dr. Clark's adoption of it, that  
16 says Marc Czapla's ever been to the Westlake Landfill?

17 **A No.**

18 Q And the same question with a slight  
19 variation. Have you seen any of that that  
20 corroborates that Marc Czapla was at the Westlake  
21 Landfill as often as he claims and for as long as he  
22 claims between 1973 and 1978?

23 **A No.**

24 Q Did you make any requests to interview Marc  
25 Czapla yourself to simply push back on that

1 information and ask your own questions and come to an  
2 independent conclusion of whether it sounded plausible  
3 to you or not?

4 MR. SOPER: Object to the form.

5 A No.

6 Q (By Mr. Beck) Have you seen patients, Dr. Hu?

7 A I still do.

8 Q When you see patients, you know, even in  
9 this pandemic moment of telemedicine, do you talk to  
10 them about their problems before diagnosing them?

11 A Of course.

12 Q I'd like to go to the next paragraph. We're  
13 now on page 5 of your report which is Exhibit 1.  
14 Towards the top, do you see a paragraph that begins  
15 using detailed information?

16 A Yes. Counselor, could I -- can we pause for  
17 a moment? I just -- I've noticed that for the last  
18 couple of minutes, my image on the screen in front of  
19 me has been frozen. Does that matter?

20 Q Sure. It matters. Let's go off the record  
21 so we can solve that if we can, and we'll let the tech  
22 support people who are so helpful try to solve that  
23 for us. I'm going to make some coffee while you do  
24 that. So let's go off the record.

25 VIDEOGRAPHER: Going off the record at

1 12:21 p.m.

2 (A break was taken.)

3 VIDEOGRAPHER: We are back on the record at  
4 12:26 p.m.

5 MR. BECK: And, Melissa, please make sure  
6 you're projecting Exhibit 1 and showing page 5.

7 MS. LOVE: I am, Bill.

8 MR. BECK: Thank you.

9 Q (By Mr. Beck) One second. All right.  
10 Dr. Hu, after we reset, are you ready to continue?

11 A Yes.

12 Q So on page 5 you give a summary description  
13 of some information that was provided by James Clark  
14 that you relied upon, and it's -- it starts in a  
15 paragraph that says using detailed information. Do  
16 you see that?

17 A Yes.

18 Q Read along, using detailed information from  
19 Dr. Czapla's interview on the timing, duration, and  
20 activities when he visited the contaminated site and  
21 methods outlined by the Agency for Toxic Substances  
22 and Disease Registry, ATSDR, for assessing community  
23 exposures to radiation, Clark and Associates proceeded  
24 to calculate the portion of the dose in millirems,  
25 mrem, that Dr. Czapla received from exposure to

1 radioisotopes deposited in Westlake Landfill,  
2 expressed as, quote, reasonable maximum exposure  
3 concentration, closed quote, in parentheses RME  
4 values. Have I read that accurately?

5 **A Yes.**

6 Q What do you understand ATSDR meant when they  
7 referred to community exposures?

8 **A I think they were trying to come up with a**  
9 **way that they can communicate to communities what the**  
10 **likely exposures were to whatever it is, toxic**  
11 **chemicals or radiation under various circumstances,**  
12 **that the community would understand and would be**  
13 **concerned about.**

14 Q Did you read a copy of the ATSDR report from  
15 which Dr. Clark worked in setting up his equation  
16 through the toolbox, tool kit?

17 **A I did at some point. I think that was last**  
18 **year but not recently.**

19 Q You've done some work on a nearby  
20 radioactive area called Coldwater Creek, have you not?

21 **A Right.**

22 Q Are you generally familiar with Coldwater  
23 Creek?

24 **A Yes.**

25 Q And you read the ATSDR report on Coldwater

1 Creek?

2 **A Yes.**

3 Q Doesn't that report specifically say that  
4 you can't use that report or its method to establish  
5 individual exposure for the causation of any  
6 individual disease?

7 MR. WATSON: Object to form and foundation.

8 **A No.**

9 VIDEOGRAPHER: Looks like we lost your  
10 screen again.

11 THE WITNESS: Geez.

12 VIDEOGRAPHER: There we go.

13 Q (By Mr. Beck) Thank you. And the question,  
14 which was objected to, but the question is doesn't the  
15 ATSDR report for Coldwater Creek specifically say that  
16 it can't be used to show individual exposures or the  
17 causation of any individual disease?

18 MR. SOPER: Same objections.

19 **A Yeah, I do recall that -- that statement**  
20 **exists in the -- in the monograph, but as far as I**  
21 **know, that still remains the best available**  
22 **methodology to make these kind of estimates.**

23 Q (By Mr. Beck) Is it true that sometimes there  
24 just isn't a sufficient available methodology to make  
25 estimates of exposure to something potentially

1 hazardous? There's just not enough information to do  
2 it reliably?

3 A That may be true in some circumstances, but  
4 in this case, I think that Dr. Clark did the best he  
5 could, and I relied on his exposure assessment.

6 Q Thank you. And do you have an understanding  
7 of what this capitalized phrase reasonable maximum  
8 exposure concentration means?

9 A Yes.

10 Q What do you understand it to mean?

11 A This is a term that basically was created by  
12 the Environmental Protection Agency regarding  
13 Superfund which is a piece of legislation that governs  
14 the disposition of hazardous waste sites all over the  
15 country. It is a way for the Environmental Protection  
16 Agency to try to sum up all the various exposure  
17 pathways and come up with an estimate of exposure, if  
18 you will, that is on the higher end of exposure  
19 estimates but within plausible range. It's definitely  
20 not a worst case scenario. It's -- it's a summary  
21 estimate of exposures.

22 Q But there's something else that's not, and  
23 that is it's not average, right? It's intentionally  
24 greater than average?

25 A Exactly, yes.

1           Q     And the term reasonable maximum exposure or  
2     the acronym R -- REM applies in two ways in a  
3     Superfund risk assessment in that it refers to the  
4     concentrations of the hazardous substance that you  
5     assume someone was exposed to, and it also refers to  
6     the assumption that you make about how frequently and  
7     for how long that person was exposed. Both of those  
8     are calculated in the Superfund context based on REM  
9     or reasonable maximum exposure, correct?

10          A     I believe so.

11          Q     Have you looked beyond Dr. Clark's report to  
12     see how the exposure point concentrations or the  
13     reasonable maximum exposure concentrations were  
14     calculated for the Westlake Landfill?

15          A     I'm not sure I understand what you mean by  
16     look beyond this report. Is that -- is that what you  
17     said?

18          Q     Well, let me ask it a different way. That  
19     was probably vague. Have you done your own work to  
20     calculate reasonable maximum exposure point  
21     concentrations for the Westlake Landfill at any -- for  
22     any point?

23          A     No.

24          Q     All right. Let's go to the next  
25     paragraph -- yeah, I'm still on page 5. And read

1 along with me. Does it say in your report, Exhibit 1,  
2 the internal committed doses calculated for Dr. Czapla  
3 that are specific to his kidneys ranged from 3.06 to  
4 3.94 E plus 03 mrem or millirem, based on -- I'm  
5 sorry, based upon the reasonable maximum exposure  
6 concentration in quotes RME values. These internal  
7 committed dose estimates to the kidney were then used  
8 to extrapolate excess risk of kidney cancer, which was  
9 estimated to range from 1.5 to 2 out of 10,000. Have  
10 I read that accurately?

11 **A Yes.**

12 Q And let's start by unwinding the scientific  
13 notation. Does 3.06 to 3.94 E plus 03 -- 03 millirem  
14 mean 3,060 to 3,940 millirem?

15 **A Yes.**

16 Q And based on your understanding of  
17 Dr. Clark's calculations, are those lifetime dose  
18 calculation?

19 **A That's what internal committed doses mean.**

20 Q Yeah, that's a good point. Let's go back  
21 and define, what is an internal committed dose. As  
22 you understand, its calculation by James Clark.

23 **A Well, internal committed dose relates**  
24 **specifically to radionuclides and what the basic**  
25 **biological impact would be based on the types of**

1     **radionuclides, the waiting factor, and how that**  
2     **translates in terms of equivalent dose to the**  
3     **particular organ.**

4           Q     The exposure pathways, Dr. Hu, you  
5     identified from Dr. Clark's report, were ingestion and  
6     inhalation; is that correct?

7           A     **Yes.**

8           Q     And ingestion means that Dr. Czapla played  
9     in dirt, some of it would get in the air and if his  
10    mouth were open, get into his mouth and he might  
11    swallow it?

12          A     **Correct.**

13          Q     And inhalation means that some of the dirt  
14    could be suspended in the air or particles of it could  
15    be suspended in the air while Dr. Czapla as a child  
16    was breathing and he could inhale it; is that correct?

17          A     **Correct. And also point out that ingestion**  
18    **includes hand-to-mouth contact which tends to be**  
19    **normal behavior for a child.**

20          Q     So a second ingestion pathway isn't just  
21    opening your mouth and sucking in what's in the air.  
22    It's also if you put your hand to your mouth and your  
23    hands got dirt on it, you can some of the dirt in your  
24    mouth; is that right?

25          A     **Correct.**

1           Q     And then let's start with the ingestion  
2     pathway. Once the dirt is in your mouth, how does it  
3     get to your kidney?

4           A     Well, have to be swallowed and then absorbed  
5     in the gastrointestinal tract, and then it goes into  
6     circulation and gets excreted by the kidney.

7           Q     Circulation through the blood?

8           A     Yes.

9           Q     And it would need to be circulated to the  
10    kidney and not excreted from the kidney?

11          A     Yeah. When it gets excreted through the  
12    kidneys, it has to actually pass through kidney tissue  
13    either by passive diffusion or active diffusion so  
14    excretion by the kidneys automatically means that the  
15    kidney cells are exposed.

16          Q     Got it.

17          A     Sometimes they'll get deposited in the  
18    kidneys as well and then just linger there, and that's  
19    true for, you know, many types of -- of substances and  
20    it's, you know, true for these radionuclides as well.

21          Q     And Dr. Clark's calculations are intended to  
22    pick up both the particle that stated residence in the  
23    kidney, and the particle that passes through the  
24    kidney and is excreted?

25          A     I believe so.

1           Q     Let's go to the inhaled particle. The  
2     inhaled particle. Once it comes in through the nose  
3     or in through the mouth, where does it go from there  
4     and how does it get to the kidney?

5           A     Well, an inhaled particle would be deposited  
6     on the -- on the naso-tracheal surface or if the  
7     particle size is below micron, it could get deposited  
8     all the way down to the pulmonary alveoli. Either way  
9     there's an opportunity for absorption into the blood  
10    stream and then circulation in the body, and, again,  
11    some of it gets excreted through the kidneys. On the  
12    way, it exposes kidney tissue and some of it gets  
13    deposited in the kidney tissue.

14                Then also I think as you might refer to  
15    inhalation involves the mucociliary clearance of  
16    particles that are deposited on the epithelium of the  
17    respiratory tree that typically leads back to the  
18    pharynx and then you swallow it, and then you have  
19    another opportunity to absorb whatever it is that you  
20    inhaled. Now it's in the gastrointestinal track and  
21    we already talked about that.

22           Q     Now, other than the inhalation pathway and  
23    the ingestion pathway, when you wrote your report,  
24    were you aware of any other pathway of radioactive  
25    exposure to the kidney that Dr. Czapla was

1 calculating?

2           **A**     You mean that Dr. Clark was calculating on  
3 behalf --

4           Q     Thank you.

5           **A**     -- of Dr. Czapla?   Yep.

6           Q     Thank you.

7           **A**     Yes.

8           Q     Said that wrong. I'll say it over. When  
9 you wrote your report, did you have awareness of any  
10 exposure pathway besides ingestion and inhalation that  
11 Dr. Clark calculated?

12          **A**     I think he might have taken into account  
13 external radiation which would be small because the  
14 kidneys are a retroperitoneal organ relatively buried  
15 and not as vulnerable to exposure to radionuclides  
16 because they're -- they're a deep tissue organ.

17          Q     So going back for a moment to this millirem  
18 calculation by Dr. Clark, why does he express it as a  
19 range rather than a single value?

20          **A**     I think part of the convention is -- is  
21 accommodating for the fact that there's different  
22 rates of absorption, particularly from the lungs, and  
23 that accounts for the two different estimates, I  
24 believe typically that are made in this kind of  
25 situation.

1           Q     And as you understand Dr. Clark's  
2     calculation, does the radioactive exposure to the  
3     kidneys stop in 1978 or continue, thereafter, based on  
4     his calculation method?

5           A     Well, I'm not exactly sure what he did --  
6     what assumptions he made, but we do know that  
7     radionuclides get deposited in the kidneys, so I would  
8     assume he would have accounted for that as well. So  
9     it's not that the exposure would be done, cleared,  
10    but, in fact, there's continuing exposure.

11          Q     And so your expectation is that the range of  
12    3,050 to 3,940 millirems lifetime is a range that  
13    would have occurred over a period of the 47 years  
14    since 1973?

15          A     Perhaps, but I -- I don't recall or know as  
16    I sit here today exactly what assumptions Dr. Clark  
17    made.

18          Q     So you didn't check his work as -- as it  
19    were. You relied on him to do it right and adopted it  
20    out without purporting to do a second review of the  
21    same effort?

22          A     I -- you know, I read his document, but I --  
23    I just can't remember, you know, those assumptions  
24    what he made.

25          Q     So do you know whether Dr. Clark calculated

1 an annual internal committed dose to the kidneys or  
2 Dr. Czapla for any particular year?

3 **A I think that might be in some of his tables**  
4 **but I don't recall. He has a long list of tables in**  
5 **his supplement.**

6 Q Do you know whether there was any year in  
7 which Dr. Clark calculated a dose in excess of 500  
8 millirems in that year?

9 MR. SOPER: To the kidneys, Bill?

10 MR. BECK: Sure.

11 **A Yeah, I don't recall.**

12 Q (By Mr. Beck) What about for the body as a  
13 whole? Did Dr. Clark calculate as much as 500 millirem  
14 exposure in any one year?

15 **A In any one year, I -- I don't recall that.**

16 Q Did Dr. Clark calculate either for the  
17 kidneys or for the body as a whole exposure in excess  
18 of 100 millirems in any one year?

19 **A I'd have to go through his report and**  
20 **refresh my memory. I don't recall.**

21 MR. SOPER: Bill, do you want him to look at  
22 his report?

23 Q (By Mr. Beck) Dr. -- Dr. Hu, if you want to  
24 look at your report, take your time and feel free. If  
25 you want to dig out Dr. Clark's report and start going

1 through the hundreds of pages of tables, I don't think  
2 we have time. There's a limit on the deposition.

3 **A Yeah.**

4 Q I didn't see in your report that helps with  
5 this.

6 **A Yeah, I didn't address that at all.**

7 Q So I want to talk about this excess risk of  
8 kidney cancer. That's in the second paragraph or  
9 second sentence of the paragraph that we're looking  
10 at. You say these internal committed dose estimates  
11 to the kidneys were then used to extrapolate excess  
12 risk of kidney cancer which was estimated to range  
13 from 1.5 to 2.0 out of 10,000. Do you see that?

14 **A Yes.**

15 Q And that's a description of what you  
16 understand Dr. Clark did in his report, correct?

17 **A That's what he did in his report based on**  
18 **tables that are available for -- for making those**  
19 **kinds of extrapolations.**

20 Q And that's the information that you relied  
21 on in order to conduct your own evaluation in this  
22 report with regard to the risk of kidney cancer,  
23 correct?

24 **A Yes.**

25 Q Now, how much of kidney cancer is renal cell

1 carcinoma?

2           **A**     **It's the great majority. I believe it's**  
3     **around 90 to 93 percent or so. The rest is**  
4     **transitional cell carcinoma and carcinoma of the renal**  
5     **pelvis which is quite a bit rare.**

6           **Q**     **What about clear cell carcinoma? Is that**  
7     **more frequent than renal cell carcinoma?**

8           **A**     **Excuse me. Clear cell carcinoma is just one**  
9     **of -- one type of renal cell carcinoma. The other**  
10    **major one being papillary.**

11          **Q**     **So you view clear cell carcinoma as a subset**  
12    **of renal cell carcinoma?**

13          **A**     **Yes.**

14          **Q**     **Okay. Now, why does Dr. Clark provide the**  
15    **risk as a range of 1.5 in 10,000 to 2 in 10,000?**

16          **A**     **I think that directly relates to the range**  
17    **he gave for the estimate of the -- the specific doses**  
18    **to the kidney, the internal committed doses that we**  
19    **just talked about.**

20          **Q**     **You're saying the ratio of 1.5 to 2 is about**  
21    **the same as the ratio of 3,060 to 3,940?**

22          **A**     **Correct.**

23          **Q**     **And so tell me if this is fair, the more**  
24    **days of exposure, the more hours of exposure that**  
25    **Dr. Clark accepted Marc Czapla as having playing at**

1 the landfill, the higher Dr. Clark would calculate the  
2 millirem exposure and the excess kidney cancer; isn't  
3 that right?

4 **A Yes.**

5 Q It's a direct linear correlation, right?

6 **A Is it linear? Probably is. Not -- I'm not**  
7 **exactly sure.**

8 Q But you're saying you know it directly  
9 correlates not sure if it's a linear correlation or  
10 some other shape?

11 **A Yeah.**

12 Q Okay. When you --

13 **A Yes.**

14 Q -- use in your report the term excess risk  
15 of kidney cancer, what you're saying is in excess of  
16 the 1 out of 42 or 1 out of 45 background risk of  
17 kidney cancer, correct?

18 **A Correct.**

19 Q Pardon me. Did you happen to calculate for  
20 comparison purposes how many that is out of 10,000?

21 **A You mean the 1 out of 42?**

22 Q Yes, sir.

23 **A I mean that would be pretty easy to**  
24 **calculate, but the challenge here, of course, is that**  
25 **this is not really a typical case of kidney cancer.**

1     **This is someone who developed kidney cancer at the age**  
2     **of 47 which is very young.**

3                 **So what is the, you know, the chance of**  
4     **somebody developing kidney cancer at that age. I**  
5     **think it's substantially lower than -- than 1 out of**  
6     **42.**

7                 Q     Not -- not that it's not relevant, but I  
8     move to strike because that wasn't responsive.

9                 So, Dr. Hu --

10                MR. SOPER: Actually it was.

11                MR. BECK: I'm -- I'm sure.

12                Q     (By Mr. Beck) Dr. Hu, are you able to  
13     calculate whether it's 1 in 42 or 1 in 45 how many that  
14     would be out of 10,000?

15                A     **Sure. Are you asking me to do that right**  
16     **now?**

17                Q     Yeah. Let's use either one you want or both  
18     of them, and just give me a range of how many  
19     background kidney cancers one would expect among  
20     10,000 people based on your understanding of it?

21                A     **About 238.**

22                Q     Now, do you suggest that -- well, strike  
23     that.

24                That is a risk over a lifetime of having  
25     kidney cancer, isn't it?

1           **A     In the general population?**

2           Q     Correct.

3           **A     As estimated by using United States**  
4 **statistics?**

5           Q     Sure. And so for an average American,  
6 there's about 238 in 10,000 background risk of kidney  
7 cancer; is that correct?

8           **A     Something like that, yeah.**

9           Q     Now, have you seen that risk laid out across  
10 ages to determine what the risk is of kidney cancer  
11 occurring at a particular age or by a particular age?

12          **A     I have not seen that statistic.**

13          Q     And you haven't calculated it yourself?

14          **A     No.**

15          Q     Is it true that a lot of people --

16               MR. SOPER: I'm sorry. Dr. Hu, did you have  
17 something?

18          **A     Yeah, sorry. I mean, what I do know is that**  
19 **the average age for developing kidney cancer is around**  
20 **64 which means clearly that he's an outlier, you know,**  
21 **having kidney cancer at such a young age, and the risk**  
22 **for that has got to be substantially than the 1 out of**  
23 **42.**

24          Q     (By Mr. Beck) But you haven't seen or  
25 prepared any graphing or data distribution that allows

1 you to say how unlikely it is for a person to get  
2 kidney cancer at the age of 47?

3 **A I have not.**

4 Q And isn't it true that even at the average  
5 age of detection is 64, that may not be the average  
6 age of occurring kidney cancer? There could be a time  
7 lag between occurrence and detection?

8 **A Well, of course but, you know, his age was**  
9 **47 when it was detected, and 64 is the age, I believe,**  
10 **of detection as -- as quoted in terms of the average**  
11 **age of a person getting kidney cancer. So you're**  
12 **comparing apples to apples there.**

13 Q So let me ask you this. If 64 is the  
14 average, that means some people are 64, some people  
15 are less than 64, and some people are more than 64,  
16 and to say more about it than that we have to see a  
17 data distribution?

18 **A Yeah.**

19 Q And you haven't seen it?

20 **A No.**

21 Q Now, I just want to go back to this risk  
22 range for lifetime excess risk of kidney cancer  
23 calculated by Clark based on claims of exposure by  
24 Czapla at 1.5 to 2 out of 10,000. In your report, you  
25 describe degrees of risk including statistics that

1 show a negligible risk, statistics that show a minimal  
2 risk, and statistics that show a very low risk. Do  
3 you recall that?

4 **A Yes, I do.**

5 Q And so if someone's lifetime excess cancer  
6 risk is less than 1 in million, that would be in the  
7 category you described as negligible?

8 **A That's directly quoting the World Health**  
9 **Organization's risk communication classification**  
10 **system.**

11 Q I hear you, but I'm directly quoting your  
12 report, right, or at least --

13 **A Yes.**

14 Q -- paraphrasing it?

15 **A Sure.**

16 Q And in your report, you describe a 1 in  
17 100,000 lifetime excess cancer risk to a particular  
18 organ as minimal; is that correct?

19 **A Right.**

20 Q And in your report you describe a 1 in  
21 10,000 risk -- lifetime excess cancer risk of kidney  
22 cancer as a very low risk; is that correct?

23 MR. SOPER: I -- I object to that. I think  
24 you mean less than that number, Bill, reading his  
25 report.

1           Q       (By Mr. Beck) Let me rephrase the question to  
2       address the objection.

3                   Dr. Hu, isn't it correct in your report you  
4       describe risks less than 1 in 10,000 as being a very  
5       low lifetime excess kidney cancer risk, correct?

6           A       **Could I have the court advance the screen to**  
7       **that section of my report, please?**

8           Q       Hold on just a second. I wasn't going to  
9       get there for a minute, but let's go there and hold on  
10      just a sec.

11                  MR. SOPER: I think it's page 10.

12                  MR. BECK: Thank you. It is.

13                  MR. SOPER: The bottom paragraph.

14           A       **Okay. Can you repeat the question, Counsel?**

15           Q       (By Mr. Beck) Sure. And so based on what you  
16      say in your report, a lifetime excess cancer risk of  
17      kidney cancer less than 1 in 10,000 would be what you  
18      categorize as a very low risk based on the World Health  
19      Organization criteria, correct?

20           A       **Yes.**

21           Q       And if Mr. Czapla overstated his exposure to  
22      the Westlake Landfill between 1973 and 1978 by, say,  
23      half of what he described, counting Dr. Clark's  
24      calculation in half, then you would say that  
25      Dr. Clark's calculation reflects a very low risk --

1 lifetime excess risk of kidney cancer; is that  
2 correct?

3           **A**     I mean, that's a hypothetical, and, I mean,  
4 I guess -- I guess I could agree with that. I have to  
5 see exactly how that happened.

6           Q     Well, and I -- I don't need to go further on  
7 that. So if Dr. Clark used accurate exposure  
8 information from Marc Czapla -- Czapla and because of  
9 inherent conservatism and overstatement of risk in the  
10 methodology he used simply calculated a risk twice as  
11 high as was real, then you would have regarded that  
12 calculation -- and I'm going to strike that and start  
13 all over.

14           **A**     Okay.

15                   MS. LOVE: Hey, Bill, it's Melissa. Hang on  
16 for a second. I can't see Dr. Hu. Can anybody else?

17           **A**     Yeah, I can't see myself either. I'm having  
18 this technical issue again. Can we pause and I'll try  
19 to do the fix that I did earlier with the  
20 videographer?

21           Q     (By Mr. Beck) Let's do that and I'll use that  
22 time to talk about this question entirely.

23                   VIDEOGRAPHER: Going off the record at  
24 1:02 p.m.

25                                   (A break was taken.)

1 VIDEOGRAPHER: We are back on the record at  
2 1:06 p.m.

3 MR. BECK: Forgive the delay. I used the  
4 unplanned break for personal comfort. We're back on?

5 VIDEOGRAPHER: Yeah. Sorry, Bill. Do you  
6 need more time?

7 MR. BECK: No, I'm good.

8 VIDEOGRAPHER: Okay. Yeah, we're on the  
9 record.

10 Q (By Mr. Beck) Okay. Dr. Hu, did Marc Czapla  
11 ever smoke?

12 A As far as I know, no.

13 Q If you found out that Marc Czapla had been a  
14 smoker at some time in his life, that would be news to  
15 you?

16 A Correct.

17 Q Does Marc Czapla have any hereditary factors  
18 or family history that has been described to you and  
19 that would be a kidney cancer risk to your knowledge?

20 A No.

21 Q Based on a medical definition, Dr. Hu, was  
22 Marc Czapla obese when his kidney cancer was  
23 diagnosed?

24 A I believe so.

25 Q And do you have any information about

1 whether and for how long he would have been regarded  
2 medically as obese prior to 2006?

3 **A I don't think so, no.**

4 Q Have you been able to run any calculation or  
5 conduct an analysis in which you exclude obesity as a  
6 possible cause of Marc Czapla's kidney cancer?

7 **A I don't think that was called for here.**

8 Q But you haven't done it?

9 **A No. I mean, as far as I'm aware, the fact**  
10 **that he has more than one risk factor for kidney**  
11 **cancer does not undercut the contributing influence of**  
12 **his radiation exposure so that was not necessary.**

13 Q We'll get back to that. Have you done  
14 anything, any calculation or analysis -- well, strike  
15 that.

16 Marc Czapla has a history of hypertension;  
17 is that correct?

18 **A Correct.**

19 Q How far back does that go?

20 **A At least until about 2006.**

21 Q And what about before you have record?

22 **A I don't have records of that so I don't**  
23 **know.**

24 Q Is it possible that Marc Czapla has been  
25 hypertensive since he was a young man?

1           **A     Sure.**

2           Q     Did you ask counsel or anyone to obtain  
3     information about how long Marc Czapla has been  
4     hypertensive?

5           **A     I don't recall.**

6           Q     Have you been provided any historical data  
7     concerning Marc Czapla's hypertension and how well his  
8     blood pressure has been controlled by medicine over  
9     time?

10          **A     I don't recall seeing that information.**

11          Q     Is Marc Czapla diabetic?

12          **A     I believe he is.**

13          Q     Do you know how long it has been diagnosed  
14     that Marc Czapla is diabetic?

15          **A     I have to go back to my notes to refresh my  
16     memory on that.**

17          Q     What's the earliest that you remember?

18          **A     I remember that he was being diet-controlled  
19     for some time. His hemoglobin A1C's weren't terrible,  
20     but then they started to get worse but I don't  
21     remember the dates.**

22          Q     Do you know whether or not Marc Czapla was  
23     diabetic in his 20s?

24          **A     I don't recall that.**

25          Q     Within the 238 out of 10,000 Americans who

1 will get kidney cancer in their lifetime, are there  
2 some of them for whom a doctor is simply unable to  
3 define a cause?

4 MR. SOPER: Object to form.

5 **A I would agree with that.**

6 Q (By Mr. Beck) So with regard to Marc Czapla's  
7 exposure -- and, actually, let me give you the benefit  
8 of your report rather than play memory quizzes with  
9 you.

10 Let's go to page 6, first full paragraph.  
11 You list one, two, three, four -- five radioisotopes.  
12 Do you know whether uranium-238, uranium-236,  
13 thorium-230, thorium-232 or radium-236 which of those  
14 are the most significant in Dr. Clark's calculation of  
15 risk that you relied upon?

16 **A I don't recall. Have to go back and look at**  
17 **his report to ascertain that description.**

18 MR. SOPER: And, Dr. Hu, it's not a memory  
19 test. You're free to refer to his report if you'd  
20 like.

21 MR. BECK: It actually is a memory test. If  
22 the doctor wants to refer to his own report, he's  
23 welcome to. If he wants to refer to a report from  
24 someone else, I'll take that under advisement, but I  
25 don't want to use up my seven hours doing research.

1 MR. SOPER: Well, if you're asking him  
2 questions about Dr. Clark's report, you should let him  
3 review the report.

4 MR. BECK: I'm asking if he has a memory  
5 about Dr. Clark's report, which I am absolutely  
6 entitled to ask and have answered.

7 **A Sure. I don't recall which specifics -- or**  
8 **radioisotopes of these elements he was basing his**  
9 **calculations on.**

10 Q (By Mr. Beck) Is it correct that uranium-238,  
11 uranium-236 and thorium-232, all three, have no  
12 material contribution to Dr. Clark's risk calculation?

13 **A I don't know and I would have to investigate**  
14 **that further.**

15 Q Do you know whether or not Dr. Clark in  
16 assessing the risk of exposure to radium-236 used data  
17 from some place close in time to the 1973 to '78 time  
18 period?

19 MR. SOPER: Object to form.

20 **A I don't know the answer to that.**

21 Q (By Mr. Beck) Do you know whether Dr. Clark  
22 in calculating the risk of exposure by inhalation to  
23 radium-226 of Mr. Czapla actually based his calculation  
24 on a risk 1,000 years from now in the future?

25 MR. SOPER: Object to form. Misstates

1 Dr. Clark's report.

2 **A I don't know the answer to that.**

3 Q (By Mr. Beck) Do you know whether Dr. Clark  
4 relied upon the final baseline risk assessment for the  
5 Westlake site supplied to EPA, and, in particular, the  
6 air modeling report attachment to that baseline  
7 assessment in determining inhalation risk?

8 **A Can you repeat the question, please?**

9 Q Sure. Let's read that one back if the court  
10 reporter has it.

11 (At this time the court reporter read  
12 back the previous question.)

13 **A I don't know. I don't recall.**

14 Q (By Mr. Beck) Do you know what thorium  
15 isotope is a daughter isotope of uranium-238?

16 **A I'd have to go back and look at the -- the  
17 series of isotopes to refresh my memory on that.**

18 Q Do you know what radium isotope is the  
19 daughter isotope of thorium-230?

20 **A Same response.**

21 Q Do you know what the process is called by  
22 which over time thorium-230 becomes radium-226?

23 **A Radioactive decay.**

24 Q Do you know how long that takes for  
25 thorium-230 to decay to radium-226?

1           **A     I'd have to go back and look at the decay**  
2   **series statistics to refresh my memory on that.**

3           Q     Is thorium-230 a gamma unit?

4           **A     It's an alpha particle and I don't think**  
5   **it -- again, I'm not sure. I don't recall.**

6           Q     Does thorium-230 emit alpha particles?

7           **A     Yes.**

8           Q     Relative to radium-226, is thorium-230  
9   regardless -- regarded as a very weak radioactive  
10   substance?

11          **A     I don't recall. I'd have to look at the**  
12   **relevant charts to answer accurately.**

13          Q     Do you know that the degree of strength or  
14   activity of a radionuclide can be expressed in a unit  
15   of measure called picocuries per gram?

16          **A     Yes.**

17          Q     Do you know the highest reading in  
18   picocuries per gram ever detected at the surface of  
19   the Westlake Landfill was for thorium-230?

20          **A     I don't recall that number.**

21          Q     For comparison purposes, do you know what  
22   the radioactivity of the thorium and thorotrast,  
23   T-H-O-R-O-T-R-A-S-T, was?

24          **A     I'm sorry. Repeat the question.**

25          Q     Do you know what the degree of radioactivity

1 in picocuries per gram was of the thorium in the  
2 solution that was known as thorotrast that was used  
3 for medical purposes in the United States?

4 **A I don't know the answer to that.**

5 Q Do you have any idea what the ratio is  
6 between the average thorium concentration in  
7 thorotrast or activity in thorotrast to the average  
8 thorium activity at the surface of the Westlake  
9 Landfill at its highest point?

10 **A I don't know the answer to that.**

11 Q Let me step away from theory for just a  
12 moment. To -- to set this up, though, in your report  
13 you adopted the view that thorium risk is linear no  
14 threshold; is that fair?

15 **A I think that's true for all radiation at  
16 this point. That is the basic assumption.**

17 Q And so my question's going to be what have  
18 you done to research whether that assumption is  
19 scientifically valid or not valid? Have you reviewed  
20 epidemiologic literature yourself, or have you simply  
21 relied on what the WHO report says?

22 **A I've relied on the expert opinion of reports  
23 such as Deep Biological Effects of Ionizing Radiation  
24 Committee.**

25 Q Is that a WHO report?

1           A     I think DBEIR was commissioned by --  
2     co-commissioned by, I guess --

3           Q     I can't hear you. I'm sorry.

4           A     Yeah, I can't remember the exact pronounce  
5     of DBEIR commission, whether it's WHO or International  
6     Agency for Research on Cancer, but it is an  
7     international and well recognized authority on  
8     radiation health effects.

9           Q     And simple -- simple question. You referred  
10    to reports plural. Are there any others besides that  
11    one that you're relying on?

12          A     That would be the main one. The  
13    Environmental Protection Agency, I believe, also  
14    accepts the linear no threshold assumption for  
15    radiation in cancer.

16          Q     You mean for Superfund risk assessment  
17    purposes?

18          A     Yes.

19          Q     Aren't Superfund risk assessments simply  
20    screening estimates used by EPA to prioritize risk  
21    relative to one and up in order to make remedy  
22    decisions?

23          A     Well, that's -- yeah, those are these exact  
24    Superfund assessment documents, but in terms of EPA's  
25    general policy on a dose risk assessment associated

1     **with radiation, I believe their assumption is the**  
2     **linear no threshold relationship between radiation and**  
3     **risk of cancer.**

4           Q     Dr. Hu, did you hear my question or was it  
5     dropped?

6           A     I think I heard your question. I think you  
7     were specifically saying is it -- you know -- is that  
8     the -- well, anyway -- repeat the question and I'll  
9     try to answer the best I can.

10          Q     Let me try again. Aren't EPA risk  
11     assessments simply risk screening exercises for the  
12     purpose of comparing one risk to another or to some  
13     line for the purpose of making remedy decisions?

14                   MR. SOPER: Asked and answered.

15          A     They are but they are also based on  
16     assumptions that the EPA typically describes in  
17     associated documents.

18          Q     (By Mr. Beck) Right. And the associated  
19     documents that matters where EPA describes its  
20     assumptions is known as the risk assessment guidance  
21     for Superfund or RAGS; is that correct?

22          A     That's one of them, yes.

23          Q     Have you reviewed the risk assessment  
24     guidance for Superfunds in your work in this case?

25          A     Not specifically, no.

1 Q What is I linear energy transfer radiation?

2 A Radiation that imparts a lot of energy in  
3 its course as part of its effects on biological  
4 tissue.

5 Q And just to define the term we've used  
6 before, what is ionizing radiation?

7 A What is what?

8 Q Ionizing radiation.

9 A Ionizing radiation is radiation that energy  
10 capable of causing ionization.

11 Q If we go over to page 7 of Exhibit 1, I'm in  
12 your expert report still, and look for a paragraph  
13 that begins in terms of radionuclides and residents  
14 impacted.

15 A Okay.

16 Q Was -- was the word resident in that  
17 sentence an -- an error?

18 A Yes. I should have just said in terms  
19 radionuclides and Dr. Czapla's exposure.

20 Q You're not calculating -- you're not  
21 assessing risk in this report to any resident near the  
22 Westlake Landfill, are you?

23 A No.

24 Q I'll -- I'll leave out of my question the  
25 issue of whether Marc Czapla was trespassing or

1 invited, and let me just ask it this way -- and that's  
2 if he was there. Let me ask it this way, do you  
3 understand that Marc Czapla's testimony is that he  
4 visited rather than resided at the Westlake Landfill  
5 site?

6 MR. SOPER: Object to form and move to  
7 strike the speech beforehand.

8 A That comports with what my understanding is.

9 Q (By Mr. Beck) What do you understand the  
10 surface -- well, what do you understand the portion or  
11 portions of the Westlake site to be where Mr. Czapla  
12 claimed he played?

13 A I've seen photographs and some diagrams, but  
14 I don't recall reviewing that any time recently so I  
15 have no memory of that.

16 Q Let me ask it this way. If I refer to a  
17 part of a landfill as being closed and covered, do you  
18 know what I mean by that? Are we communicating if I  
19 use that phrase?

20 A My basic assumption would be is that it was  
21 fenced off and covered with something.

22 Q I didn't say anything about fencing. I'm  
23 just saying that as landfills progress, they use up  
24 some of the land, finish putting in garbage, put on  
25 the cover and move on. If I refer to a landfill being

1 closed and covered and that's what I mean, will you  
2 understand me?

3 **A Okay. I'll take that as an assumption.**

4 Q Thank you. And so my question is: Do you  
5 have any understanding whether Marc Czapla claims he  
6 played between 1973 and 1978 in any of the landfill  
7 that was not closed and covered?

8 **A I don't recall whether that was addressed in**  
9 **Dr. Clark's report.**

10 Q And you don't recall whether that was  
11 addressed in Marc Czapla's deposition that you read?

12 **A I don't recall.**

13 Q You don't recall whether that was addressed  
14 in Marc Czapla's questionnaire that you provided him?

15 **A The only questionnaire I gave him was**  
16 **regarding family history of cancer, so no.**

17 Q And you didn't follow up on that question to  
18 get a better understanding of where he says he got  
19 exposed?

20 **A Well, as I said before, I relied on the**  
21 **exposure assessment conducted by James Clark and**  
22 **Associates.**

23 Q Right, but you didn't follow up on that by  
24 asking your own questions about that topic?

25 **A No.**

1           Q     And so do you know simply as a general fact  
2     that there are only certain discreet portions of the  
3     Westlake site that have been found to contain  
4     radioactive material?

5           A     I don't know enough to have an opinion on  
6     that.

7           Q     All right. It's not an opinion question.  
8     You don't know if there are or not?

9           A     I don't.

10          Q     Do you have any information about how many  
11     acres of the Westlake Landfill site have been found to  
12     contain radioactive materials?

13          A     Not that I recall.

14          Q     Do you have any information on when those  
15     specific areas of the Westlake site were closed and  
16     covered?

17          A     Not that I recall. I mean, like I said, I  
18     read the reports regarding this site, I believe, in  
19     the past, but I can't recall them. It's been quite  
20     some time.

21          Q     Do you have any reason to think that -- that  
22     the areas of the landfill where radioactive materials  
23     were eventually found were actually used for more  
24     landfilling after they were closed and covered?

25          A     I'm not aware of any information on that.

1           Q     Do you have any reason to think that it  
2     would be bulldozers and trucks driving over an area of  
3     a landfill that's closed and covered as opposed to  
4     areas of the landfill that are open and operating to  
5     dispose garbage?

6           MR. SOPER:  Objection.  Outside the scope.  
7     Asked and answered.

8           A     **I don't have an opinion on it.**

9           Q     (By Mr. Beck) Not an opinion question.  It's  
10    a fact question.  Do you have any information on that?

11          A     **No.**

12          MR. SOPER:  Object to form.

13          Q     (By Mr. Beck) Do you know whether or not the  
14    areas of Westlake Landfill which were closed and  
15    covered -- strike that.  I'm going to start over.

16                Dr. Hu, do you have any information on  
17    whether the areas of Westlake Landfill for Mr. Czapla  
18    claims to have played between 1973 and 1978 were  
19    vegetated at any point during those years?

20          A     **I don't recall.**

21          Q     Do you have any information about whether  
22    any portion of the area where Mr. Czapla claims to  
23    have played was actually occupied by a building during  
24    some of the years when he claims he played in the  
25    dirt?

1           **A     I don't know.**

2           Q     Have you seen any data with respect to  
3     radioactive material at the Westlake Landfill  
4     collected before 1976 or reported before -- before  
5     1977?

6           **A     Can you repeat that question, please?**

7           Q     Sure. Have you seen any data concerning  
8     surface radioactive materials at the Westlake Landfill  
9     which were collected before 1976 or reported before  
10    1977?

11          **A     I may have but I don't recall.**

12          Q     I haven't so if you think of one, will you  
13    please tell me, please?

14          **A     Sure.**

15          Q     Thank you. Do you know of anyone who came  
16    out and checked the Westlake Landfill for radioactive  
17    materials prior to May of 1976?

18          **A     I don't recall.**

19          Q     Now, I'd like to go in your report,  
20    Exhibit 1, on page 7 to the first full paragraph which  
21    is the one that contains that term resident that we  
22    decided shouldn't be there. Do you know which I'm  
23    talking about?

24          **A     Yes.**

25          Q     In terms of radionuclides and residents, can

1     you see that?

2             **A     Yes.**

3             Q     So it says in terms of radionuclides and  
4     residents impacted by the Westlake Landfill exposures,  
5     the analysis conducted by Dr. Clark indicates that  
6     Dr. Czapla was likely subject to radionuclide  
7     exposures to a significant degree through inhalation  
8     and ingestion and, in parentheses you say factor A,  
9     and that the magnitude of the doses received  
10    particularly in the past, likely exceeded background  
11    levels to a significant degree, in parentheses you say  
12    factor B. Have I read that sentence -- that sentence  
13    accurately?

14            **A     Yes.**

15            Q     And so when you say background levels, are  
16    you referring to background levels of radioactivity in  
17    surface soil?

18                   MR. SOPER: Well, I object to that. You're  
19    asking him about Dr. Clark's report, not letting him  
20    look at Dr. Clark's report.

21                   MR. BECK: Okay. Well, You're wasting time  
22    and we'll deduct from your seven hour -- we'll add it  
23    to your seven hours.

24            Q     (By Mr. Beck) Dr. Hu, can you answer the  
25    question, please?

1 MR. SOPER: At what? Add to your seven  
2 hours when he looked at his reliance material?

3 MR. BECK: That is a suggestive objection.  
4 Stop.

5 MR. SOPER: No. These questions are  
6 improper when you're not letting him look at things.

7 MR. BECK: I didn't not let him look at  
8 things, but I'm not going to waste my seven hours for  
9 him to go back and reread Clark. I'm asking a simple  
10 question that asks what he can tell me and you don't  
11 get to interrupt and tell him to go read things and  
12 slow this down.

13 MR. SOPER: I'm not telling him to read  
14 anything. I'm -- I'm saying he should be able to look  
15 at the reliance material.

16 MR. BECK: Just stop talking.

17 MR. SOPER: I -- I will object.

18 MR. BECK: Thank you. You have.

19 Q (By Mr. Beck) Dr. Hu, when you say in your  
20 sentence of your report that certain radio ac --  
21 radionuclide exposures exceeded background levels to a  
22 significant degree, I'm trying to find out what you  
23 mean in your words by the -- by the expression  
24 background levels. Does that refer to the background  
25 radioactivity levels of normal surface soil?

1 MR. SOPER: Same objections.

2 A I'm not sure I was quoting Dr. Clark's  
3 report and have to go back to his report to refresh my  
4 memory as to his definition of background levels.

5 Q (By Mr. Beck) Do you know, without going back  
6 to do a reading, what Dr. Clark meant when he said that  
7 Dr. Czapla was exposed to radionuclides by inhalation  
8 and ingestion that exceeded background levels to a  
9 significant degree?

10 A Like I said, I'd have to go back and see  
11 whether he meant background levels as background in  
12 so -- as you said, normal soil that is soil that's  
13 not, you know, at a contaminated site or whether he  
14 meant background levels soil that was, let's say, you  
15 know, a mile away or half mile away from the -- the  
16 contaminated site. So it's several different ways you  
17 could define background levels. I'm not exactly sure  
18 which definition he used. I'd have to look at his  
19 report to refresh my memory.

20 Q You didn't put that question to Dr. Clark?

21 A Not in this particular case, no.

22 Q You wrote your report. You finished your  
23 report on Friday, right?

24 A Yes.

25 Q And this is Monday?

1           **A     Yep.**

2           Q     So when you said in your report in the  
3     sentence we just read exceeded background levels to a  
4     significant degree, did you know what you meant by  
5     background level?

6           **A     I was quoting Dr. Clark on that particular**  
7     **point, and like I said, I can't remember exactly how**  
8     **he defined background levels.**

9           Q     So let me ask you this. Do you know that  
10    all sorts of soil around the globe contain greater or  
11    lesser degrees of radioactivity --

12          **A     Yes.**

13          Q     -- that it's everywhere?

14          **A     Yes.**

15          Q     And you've given me a couple of options for  
16    what Dr. Clark might have meant. One was background  
17    soil -- values for radioactivity in soil everywhere or  
18    background level in soil from a particular location  
19    that might have been a half a mile or mile away. Did  
20    I get that right?

21          **A     Correct.**

22          Q     And are there any other candidates that  
23    you're thinking of for what Dr. Clark meant by this  
24    expression you quoted without quote marks in your  
25    report of background level?

1           **A     No.**

2                   MR. SOPER:  Objection.  Calls for  
3   speculation.

4           Q     (By Mr. Beck) Dr. Hu, is there background  
5   ambient radioactivity in the world?

6           **A     Ambient is a general term referring to the**  
7   **environment.  It's actually typically used for**  
8   **airborne levels.  So is that what you mean by ambient**  
9   **or what?**

10          Q     No.  No.  I mean, if a person walks around  
11   the earth any place, they're going to be exposed to a  
12   certain amount of radioactivity; is that correct?

13          **A     Yes.**

14          Q     And for your report or from general  
15   knowledge, do you know what the background radioactive  
16   exposure is in the United States or in this area  
17   expressed as millirems per year?

18          **A     I'd have to go back and look at some charts**  
19   **to refresh my memory on that.**

20          Q     If I say that the background radiation  
21   exposure exceeds 600 millirems per year, do you know  
22   if that's right or wrong?

23                   MR. SOPER:  And I object to there not being  
24   a time in that you're talking about, Bill.

25                   MR. BECK:  It doesn't change a lot over

1 geologic history, Jon.

2 MR. SOPER: Well, I object --

3 A That seems high --

4 MR. SOPER: -- foundation.

5 Q (By Mr. Beck) Go ahead, Dr. Hu.

6 A It seems high to me and I think by  
7 background in this situation, you're actually talking  
8 about what a typical individual experiences which not  
9 only includes background radiation from soil and food  
10 and whatever but also radiological tests, et cetera,  
11 et cetera. So I'm -- I am -- I don't really know what  
12 definition you're using for background, but if you  
13 mean background just from soil, that I believe is a  
14 high figure.

15 Q Right. I'm not talking about that. I'm  
16 saying average person walking around they might have a  
17 spouse, they might live in a brick house, they might  
18 be subject to the cosmic rays that all of us  
19 experience outside, but the background radiate --  
20 radioactivity dose per year is on average in excess of  
21 600 millirems, and the question is do you know if  
22 that's right or wrong?

23 MR. SOPER: Foundation. Objection.

24 A That still seems high. Yeah, that still  
25 seems high because you did not mention typical

1     **radiological procedures which I believe are included**  
2     **in the usual estimates of so-called background by, you**  
3     **know, standard radiology safety manuals.**

4           Q     (By Mr. Beck) And let me ask you, Dr. Hu, I  
5     know you're -- you're experienced at giving  
6     depositions, but a reminder is always good. It's  
7     important for Jonathan to get his objections on to the  
8     record, and the court reporter can't do that if you're  
9     both talking. So if you hear him start to speak, if  
10    you could just hold up and give your answer after John,  
11    that will help us make a good record here. Is that  
12    okay?

13           A     **My apologies.**

14           Q     And I'm -- I'm not scolding. I forget all  
15    the time, and I've taken depositions for a while.

16                    So as I read this sentence that we just read  
17    on page 7 of your report and try to dissect a little  
18    bit, do you see that after you say that the exposures  
19    likely exceeded background levels to a significant  
20    degree, you've got factor B. Have I said that  
21    accurately?

22           A     **Right.**

23           Q     And is factor B a Bradford Hill criterion or  
24    something else?

25           A     **No, that's the fact that the -- the basic**

1 estimate made by Dr. Clark who said he was exposed to  
2 these radionuclides and likely absorbed into his body  
3 which was sort of factor B --

4 Q Factor B?

5 A -- that's articulated in the paragraph  
6 above.

7 Q Okay. Got it. I see it. Thank you. So  
8 with respect to alpha particles, the same paragraph,  
9 you say alpha particles are not -- quote, are not very  
10 penetrating and can be stopped in the outer layers of  
11 skin. Have I read that correctly?

12 A Well, it's the alpha particle associated  
13 radiation that is not very penetrating. It's not the  
14 alpha particles themselves.

15 Q Okay. That's -- that's why you don't try to  
16 estimate how much dirt Marc Czapla allegedly got onto  
17 his body playing on the landfill day after day, and  
18 months after months, year after year, but rather you  
19 calculate what gets inside his body either through  
20 ingestion or inhalation; is that right?

21 A Correct.

22 MR. SOPER: Object to form.

23 A Oh, sorry.

24 MR. SOPER: Hey, Bill, can we take another  
25 quick break? I just got texted a picture that a tree

1 limb fall off at my home so I need to make a phone  
2 call about that real quick.

3 MR. BECK: That's not a problem.

4 VIDEOGRAPHER: Going off the record at  
5 1:46 p.m.

6 (A break was taken.)

7 VIDEOGRAPHER: We're back on the record at  
8 1:56 p.m.

9 Q (By Mr. Beck) Dr. Hu, after the break, are --  
10 are you ready to go?

11 A **Yep. Although I'm getting hungry, so I**  
12 **think we have another hour, though.**

13 Q So just a housekeeping detail, did you know  
14 that there was a deposition notice with an Exhibit A  
15 that contained a list of things that we were asking to  
16 be produced for your deposition?

17 A **Yes.**

18 Q And did you endeavor to produce those to Mr.  
19 Soper so he can share them with us?

20 A **I did.**

21 Q The one category I saw in that Exhibit A  
22 that I didn't see any of in the production was  
23 invoices. Have you rendered any invoices for your  
24 work on the review of information, the report, for  
25 this deposition up to this point?

1           **A     Not yet.**

2           Q     Approximately how much time do you think you  
3     have into it up to now before today?

4           **A     Have to go through my records, but I'd say**  
5     **maybe -- there were a lot of records but 20 -- 24**  
6     **hours, something like that.**

7           Q     And for the time you spent reviewing  
8     information preparing your report, what -- what are  
9     you charging in this case?

10          **A     \$600 an hour.**

11          Q     I'm sorry, I didn't hear you?

12          **A     \$600 per hour.**

13          Q     And is there a different rate you plan to  
14     try to charge for your deposition than that?

15          **A     Yes. And I apologize if you didn't get the**  
16     **rate sheet, but I charge \$1,000 per hour deposition**  
17     **time.**

18          Q     Let's go back in your report, please, which  
19     is Exhibit 1 back to page 7 and back to this paragraph  
20     which starts with the words in terms of radionuclides  
21     and residents, and I want to get about two-thirds of  
22     the way down that paragraph and ask you to look at a  
23     sentence that says once they enter the body such alpha  
24     emitting radionuclides. Do you see where that is?

25          **A     Yes.**

1           Q     And you state, quote, once they enter the  
2     body such alpha emitting radionuclides could be  
3     expected to increase a risk of causing cancer, since  
4     as noted earlier, the evaluations of all internally  
5     deposited radionuclides that emit either alpha or beta  
6     particles were declared by the International Agency  
7     for Research on Cancer to be carcinogenic, in  
8     parentheses, i.e. group 1 carcinogens, closed  
9     parentheses, based on data in human and in  
10    experimental studies. Have I read that accurately?

11           A     **Yes.**

12           Q     And are you relating the conclusion of IARC  
13    on that, or are you expressing your own conclusion,  
14    too?

15           A     **That's the conclusion of IARC.**

16           Q     (By Mr. Beck) And IARC is the -- is that  
17    correct?

18           A     **Yes, IARC is the International Agency for  
19    Research on Cancer.**

20           Q     Thank you. Now, did you in performing your  
21    research in this case look for epidemiologic or case  
22    studies associating specifically the thorium-230 with  
23    an increased incidence of kidney cancer?

24           A     **I look for studies of thorium in particular  
25    including thorium-230 and the -- and the incidence of**

1     **renal cancer, yes.**

2           Q     And other than thorotrast studies, did you  
3     find any particular studies that you concluded  
4     associated thorium exposure through inhalation or  
5     ingestion with an increase incidence of kidney cancer?

6           A     Not really. I mean, the -- the problem is  
7     that it's very difficult studies that select --  
8     selectly identify thorium as the exposure. There are  
9     studies that have, you know, workers exposed to a -- a  
10    mixture of radionuclides but that doesn't really allow  
11    you to focus specifically on thorium. So the  
12    thorotrast studies, for better or for worse, represent  
13    perhaps the only rigorous and available body of  
14    literature to focus specifically on thorium in human  
15    beings.

16          Q     Understood. So thorotrast was a liquid  
17    colloidal suspension containing thorium particles that  
18    a person would drink in order to provide contrast for  
19    medical imaging; is that right?

20          A     That's correct.

21          Q     And so people heard the phrase barium enema  
22    as sort of that, you -- you -- you drink something  
23    radioactive and it shows up on an image?

24          A     More or less, yes.

25          Q     Did you do any research to find out the dose

1 an average patient would receive drinking this thorium  
2 suspension before an imaging to determine just how  
3 much of a dose this person is ingesting?

4 **A I've seen those figures but I can't recall**  
5 **them there.**

6 Q Did you make any effort to compare that dose  
7 to the dose Clark calculates that he says was either  
8 ingested or was inhaled or was absorbed by being near  
9 something radioactive, all of those combined? Did you  
10 do any of those comparison between the thorium and the  
11 thorotrast study and the thorium that Clark says  
12 exposed Dr. Czapla in this case?

13 **A No, I didn't feel that was necessary. Since**  
14 **this is a general causation question, I was using that**  
15 **literature to address.**

16 Q So you have a background in epidemiology in  
17 addition to being a medical doctor; is that true?

18 **A I have a doctoral degree in epidemiology.**

19 Q And there's a phrase that is sometimes used  
20 among toxicologists and epidemiologists. It's  
21 colloquialism but it's the dose is the poison. You've  
22 heard that phrase?

23 **A Of course.**

24 Q Are there some things that lower doses are  
25 not harmful to a human at all but at higher doses can

1 be harmful to a human?

2 **A Yes.**

3 Q Are there features of the way that the body  
4 reacts to -- I'm going to strike that.

5 Sometimes can you drink something that is  
6 not particularly good for you, but the body takes care  
7 of it and it never causes you any harm at all?

8 MR. SOPER: Object to form.

9 **A That's a pretty broad generalization, but I**  
10 **would say that's probably true.**

11 Q (By Mr. Beck) And what are some of the  
12 processes in the body that help prevent harm from  
13 occurring as a result of that?

14 **A Well, first, here's the question of whether**  
15 **the harmful substances absorbed at all. Some things**  
16 **are passively absorbed. Others require distinct**  
17 **molecular mechanisms that is transporter proteins**  
18 **to -- to bring in the harmful substance into the body.**  
19 **Then once the so-called harmful substance is in the**  
20 **body, there are mechanisms to try to excrete it.**  
21 **Liver has an entire reticuloendothelial system to try**  
22 **to isolate harmful things and throw it into bile, and**  
23 **you'll excrete it and your excrement. The kidney will**  
24 **try to excrete substances. Unfortunately, it often**  
25 **means that the kidneys exposed to quite a bit of**

1     whatever the harmful substance is.

2                     And then it concentrates in the urine which  
3     then makes the exposure even higher to the kidney and  
4     the collecting ducts and the rest of the urinary  
5     excretory system, and then, you know, liver has a  
6     detoxification mechanism to try to molecularly  
7     transform the harmful substance and to a less harmful  
8     substance or a substance that's more polar and -- and  
9     able to be absorbed in water, therefore, excreted by  
10    the kidneys, then the body has, you know, various  
11    barriers.

12                    There's the blood-brain barrier that is an  
13    extra layer of protection to try to protect the brain  
14    from things circulating in the body that might be  
15    harmful to the central nervous system and so forth.

16            Q     Did you read any studies that more on the  
17    question of cancer risk from exposure to radionuclides  
18    that you did not include in your report and materials  
19    supplied to Mr. Soper? I'm talking about in your work  
20    on this case.

21            A     That was pretty vague question. Can you try  
22    to --

23            Q     Sure. In working -- sure. In working on  
24    this case --

25            A     Yes.

1           Q     -- did you review some studies bearing on  
2     radioactivity and kidney cancer that you did not cite  
3     in your report and give to Mr. Soper?

4           A     Yes.

5           Q     And can you remember any of them that you  
6     read but didn't use?

7           A     I think there was at least one thorotrast  
8     study which did not remark on whether kidney cancer  
9     was elevated or not or did not find increased renal  
10    kidney cancer, and I don't remember which of the  
11    thorotrast studies that are out there that was but  
12    I've read those.

13          Q     Are you familiar with what are sometimes  
14    called the atomic bomb blast survivor study?

15          A     Yes.

16          Q     Did you review any of those for your work on  
17    this case?

18          A     No, because the atomic bomb survivors were  
19    mostly exposed to gamma radiation, and we're trying to  
20    specifically look at this question of radionuclides so  
21    I'm not sure that I found that relevant. Certainly  
22    radi -- Radiation Effects Research Foundation which is  
23    the foundation that specifically created to examine  
24    the cancer experience after the atomic bombs looked at  
25    all that. I believe that's included in part of the

1 foundation's work and part of what was examined by  
2 agencies like IARC to determine that ionizing  
3 radiation in general causes kidney cancer.

4 Q Are you familiar with what are sometimes  
5 described as the nuclear plant worker studies to  
6 assess the effects of long term low dose exposure to  
7 people and whether or not that exposure is related to  
8 particular cancers?

9 A Yes.

10 Q Did you review any of those in your work on  
11 this case?

12 A I thought -- I saw some of them, but, again,  
13 these are industries where there's exposure to  
14 multiple different radionuclides, so it's -- I think  
15 it's hard to disentangle whatever might be happening  
16 with, you know, other radionuclides or other forms of  
17 radiation exposure so I didn't feel that those were as  
18 involved.

19 Q So just to this -- this -- this may feel  
20 repetitive, but I'm trying to set in the transcript a  
21 reference that will make the next question work. And  
22 that is you relied on Dr. Clark's calculations, and  
23 your understanding is that Dr. Clark relied on Marc  
24 Czapla's description of how often he went to the  
25 landfill or said he went to the landfill and how long

1 he says he stayed; is that all true?

2           **A     That's among the things that he relied upon,**  
3 **yes.**

4           Q     Did you write anything in this report about  
5 the phenomenon referred to as we recall bias?

6           **A     I did not.**

7           Q     Are you familiar generally with the  
8 phenomenon of recall bias?

9           **A     Yes.**

10          Q     Have you written any scholarly writings that  
11 address the phenomenon of recall bias?

12          **A     I mean, Counselor, I've published over 300**  
13 **research reports. I don't think I discussed recall**  
14 **bias as a methodology, but I may have discussed recall**  
15 **bias or the potential for recall bias in setting of a**  
16 **particular epidemiology study. I just don't remember.**

17          Q     You can't -- you can't steer me in the  
18 direction of one other than saying read all 300, you  
19 may find it?

20          **A     Right. Not a question that I've considered,**  
21 **and I can't think of anything right off the top of my**  
22 **head.**

23          Q     Do you try to stay up on the literature as  
24 it comes out when it's specific to the phenomenon of  
25 recall bias?

1           **A**     Well, I mean, I think, you know, there's  
2     zillions of articles published every year in  
3     epidemiology and epidemiologic methods, but I believe  
4     I -- you know, I understand what recall bias is. And  
5     when we conduct research we try to understand the  
6     potential for that and take that into account either  
7     in design study or the interpretation of the results.

8           **Q**     Have you read the study that was published  
9     with regard to assessing the phenomenon of recall bias  
10    in the specific context of brain cancer patients who  
11    were asked about their cell phone usage and then their  
12    answers were compared to the records of their actual  
13    cell phone usage?

14          **A**     I don't recall reading that study.

15          **Q**     Do -- do you have any recollection of just  
16    how much they overstated just from hearing about it?  
17    Anything -- any recollection of how much they  
18    overstated their cell phone usage as compared to the  
19    actual records?

20          **A**     No.

21                   MR. SOPER: Lacks foundation. Calls for  
22    speculation.

23          **Q**     (By Mr. Beck) Dr. Hu?

24          **A**     No, I don't.

25          **Q**     Do you agree professionally that recall bias

1 is real or can be real?

2 **A Yes.**

3 Q And have you made any assessment in this  
4 case up to now of whether recall bias is a significant  
5 uncertainty that should be taken into account in  
6 assessing Dr. Clark's calculations and their  
7 importance?

8 **A I have not.**

9 Q Is one of the factors that you considered in  
10 your report a factor of plausibility?

11 **A Yes.**

12 Q And as you used it, what did you mean with  
13 reference to plausibility?

14 **A Plausibility refers to there being a**  
15 **mechanism by which a punitive risk factor could**  
16 **actually cause the effecting question. So, for**  
17 **instance, it has been shown that cigarette smoking**  
18 **causes lung cancer. Well, cigarette smokers typically**  
19 **have yellow fingers and because they're smoking and**  
20 **nicotine or whatever tar residue gets on their**  
21 **fingers, and one of the examples we talk in class is,**  
22 **well, can yellow fingers cause lung cancer and there**  
23 **is an association?**

24 **You study people who have yellow fingers --**  
25 **chronically have yellow fingers versus people who**

1 don't have yellow fingers, they'll have an elevated  
2 risk of cancer so there's a causal relationship, and  
3 the answer is obviously is it's not -- it's not yellow  
4 fingers. It's the fact that it's a proxy for someone  
5 being a smoker because there is no biological  
6 mechanism by which typically having yellow fingers can  
7 give you lung cancer.

8 So in this case, you know, trying to  
9 understand the carcinogenic potential of thorium and  
10 radium is understanding that these are the  
11 radionuclides, there are alpha emitters, they can get  
12 in the body. The studies clearly shows that it can be  
13 distributed through the body into the kidney, excreted  
14 in the kidney.

15 They can -- they can actually translocate  
16 and be deposited in the kidney, and those are all  
17 scientific realties, if you will, that underpin a  
18 mechanistic pathway by which, yes, it is plausible  
19 that these radionuclides can cause kidney cancer.

20 Q Thank you for your answer. You didn't  
21 conduct an assessment in this case of the plausibility  
22 of Marc Czapla's story, correct?

23 A No. No.

24 MR. SOPER: Object to form.

25 A Not my role in this case.

1           Q       (By Mr. Beck) So with respect to the  
2       discussion that you just had of the factor of  
3       plausibility, let's go back to your report on page 8.

4           MR. BECK:   Melissa, when that's up, let me  
5       know, please.

6           MS. LOVE:   We're there, Bill.

7           MR. BECK:   Thank you.

8           Q       (By Mr. Beck) Dr. Hu, can you look at the  
9       paragraph in which you say, thus, the direct exposure  
10      of kidney tissue to thorium associated and radium  
11      associated carcinogenic alpha particles fulfills the  
12      criterion of plausibility.   First, have I read that  
13      accurately?

14          A       **Yes.**

15          Q       And you capitalize plausibility just to  
16      signify that that's one of the criteria that you're  
17      looking at?

18          A       **Correct.**

19          Q       And then immediately after that you say  
20      second, although it is acknowledged that relatively  
21      little data exists on the health effects of thorium in  
22      either humans or animals based on inhalation, oral, or  
23      dermal exposure, information can be drawn from the  
24      prospective epidemiologic study conducted on subjects  
25      who received intravenous thorotrast.   Have I read that

1 accurately?

2           **A     Well, you said information. The word I used**  
3 **was actually inference.**

4           Q     Thank you. Let me reread it. Second,  
5 although it is acknowledged that relatively little  
6 data exists on health effects of thorium in either  
7 humans or animals based on inhalation, oral, or dermal  
8 exposure, inference can be drawn from the prospective  
9 epidemiologic studies conducted on subjects who  
10 received intravenous thorotrast. Now did I get it  
11 right?

12           **A     Yes.**

13           Q     Thank you. And so just to define terms,  
14 what is a prospective epidemiologic study?

15           **A     It's a study in which the subjects are**  
16 **followed over time beginning when the -- when the**  
17 **study period is initiated, and the -- the exposure is**  
18 **documented and the health effects then occur later in**  
19 **time which allows you to appreciate that there's a**  
20 **sequence. There's the exposure occurs at one time and**  
21 **a health effect occurs later.**

22           Q     And so will -- will you give me a thorotrast  
23 study refers to a high concentration of thorium that  
24 is directly ingested into the human body?

25           **A     Yes, I would agree with that.**

1           Q     And in that same paragraph you describe a  
2     study of Swedish patient -- patient and you say,  
3     quote, in this regard in a study of 432 Swedish  
4     patient -- patients exposed to radioactive thorotrast,  
5     a significantly elevated risk of kidney cancer was  
6     observed. In this population, seven cases of kidney  
7     cancer were observed yielding a standard incidence --  
8     carries over the next page -- ratio of 3.4, 95 -- in  
9     parentheses you say 95 percent confidence interval,  
10    1.4 to 7.0. So I want to talk about that study.  
11    First, did I read that accurately?

12           A     **Yes.**

13           Q     And in that study, was there any information  
14    about the thorium concentration of the thorotrast to  
15    which the 432 Swedes had been exposed of whom seven  
16    contracted kidney cancer in their lifetimes?

17           A     **I'm sure there was some information about  
18    the -- about the dosing, but I don't recall what it  
19    was.**

20           Q     And then the reference to a standard  
21    incidence ratio, is that just the number of cases  
22    divided by the number of study patients?

23           A     **That's correct. And standardized to the age  
24    distribution of both the patients and the reverent  
25    population.**

1           Q     And with those seven -- okay. So in the  
2     parenthetical, you refer to a 95 percent confidence  
3     interval of 1.4 to 7.0. Is that percent -- is the 1.4  
4     a percent 7.0 percent --

5           A     No. It's just -- it's a ratio. It's the --  
6     it's the -- basically as what's been referred to as  
7     the incidence ratio, standardized incidence ratio. So  
8     the point estimate is 3.4, and the 95 percent  
9     confidence interval which is defined as the interval  
10    in which the true so-called incidence ratio likely  
11    occurs with 95 percent probability is between 1.4 and  
12    7.0.

13          Q     Let me try --

14          A     The central estimate.

15          Q     The 3.4 is the percentage of the patients  
16    who had kidney cancer; is that right?

17          A     No. No. No. It's the ratio of the number  
18    of people who developed the cancer versus the number  
19    that would have been expected if the kidney cancer  
20    rates that occur in the general population were  
21    applied to these however many 432 Swedish patients.

22          Q     So that the expected percentage was  
23    3.4 percent; is that right?

24          A     No. The expected ratio --

25          Q     I'll withdraw the question.

1           A     -- be 1 --

2           Q     I'll withdraw the question.

3           A     -- 1.0, in other words, the ratio of the  
4     observed --

5           Q     I'll withdraw the question in response to  
6     your chuckling.

7                     So is the 3.4 the expected numbers -- number  
8     of kidney cancers in the 432 patients --

9           A     No. No.

10          Q     -- without thorotrast?

11          A     No. The expected number is probably  
12     somewhere around 2. I didn't list it right here. The  
13     3.4 is simply the ratio of observed cases over the  
14     number of expected cases.

15          Q     Right.

16          A     So it's a -- it's not a percentage.

17          Q     Understood. So you're saying the standard  
18     incidence ratio is the ratio between 7 and the  
19     background kidney cancer risk?

20          A     Well, the 95 percent confidence interval --

21          Q     Right, I'm not --

22          A     -- true standardized incidence ratio is  
23     somewhere between 1.4 and 7.0.

24          Q     Right. But when you wrote the word -- when  
25     you wrote the word standard incidence ratio of 3.4,

1 that 3.4 is 7 divided by the expected number of cases  
2 based on background kidney cancers, true?

3 **A Based on background kid -- kidney cancer**  
4 **rates applied to the 432 Swedish patients and**  
5 **standardized for age.**

6 Q Thank you. Now, there's a second study  
7 described right after that in the same paragraph  
8 referring to radium and 899 patients who were treated  
9 with radium for ankylosing spondylitis; is that  
10 correct?

11 **A Yes.**

12 Q Among other conditions?

13 **A Yes.**

14 Q So my question's going to be how important  
15 was radium in Dr. Clark's calculations if you can tell  
16 me without going to read it?

17 **A I'm not sure. You know, I think he was**  
18 **looking at the sum of radionuclides, but I can't**  
19 **remember how radium might have played into or what --**  
20 **what proportion radium might have played into his**  
21 **calculations.**

22 Q And when you say that the 899 patients in  
23 that second study were treated with radium, what does  
24 that mean?

25 **A I believe they were injected with radium as**

1     **part of the treatment protocol for these conditions.**

2           Q     And how did that radium isotope compare to  
3     the radium isotope Dr. Clark estimated, primary one?

4           A     I don't recall. I'd have to take a look at  
5     the paper and Dr. Clark's paper and try to -- to try  
6     to answer that question accurately.

7           Q     And how did -- how does the radioactivity,  
8     an amount of the radium that was injected in those 899  
9     patients, compare to the radioactivity as the radium  
10    that Dr. Clark assessed as having been inhaled for or  
11    ingested if you remember?

12          A     I'm sure it's higher, but I couldn't  
13    quantify how much higher.

14          Q     Don't you need to know that comparison in  
15    order to determine whether that study supports  
16    strength of association and specificity or not?

17          A     Well, again, this is a general causation  
18    question. Does this exposure cause cancer or not or  
19    this particular type of cancer? The toxicology animal  
20    studies, for instance, are done all the time using  
21    doses much higher than are countered in humans just to  
22    see whether a substance can cause the effect of  
23    interest. Then the rest of it relates to, you know,  
24    the specific cases and other considerations, but as a  
25    general causation matter, I think these are perfectly

1     usable studies for this -- for this question  
2     particularly since as we discussed earlier, there is  
3     no threshold below which radiation is not known to be  
4     a carcinogenic risk.

5           Q     You're saying according to the studies that  
6     you cite, there is an assumption that there is no  
7     threshold below which exposure to radiation is a  
8     cancer risk, correct?

9           A     I don't think the studies themselves make  
10    any assumption. They simply report the epidemiologic  
11    data as they see it. I think in interpreting those  
12    studies and their relevance, I think it's important to  
13    appreciate that radiation associated cancers are not  
14    known to have a threshold below which there's no risk.  
15    So, you know, thorium injected or radium injected  
16    doesn't cause any type of cancer in the world.  
17    They -- causes some cancers and to understand what  
18    those cancers are that are significantly associated  
19    with these exposures helps advance our state of  
20    knowledge of general causation. Can these  
21    radionuclides cause cancer X, Y, or Z?

22          Q     And I think I understand what you're saying  
23    about general causation, but let me put it another  
24    way. Are you aware of any study that says that  
25    exposure to thorium or radium or both in the activity

1 levels projected or estimated by Dr. Clark did cause  
2 kidney cancer in a person?

3 MR. SOPER: Form and foundation.

4 A May I answer?

5 Q (By Mr. Beck) Yes, please. You can answer  
6 them all.

7 A Yeah, sure. I mean, no studies exist simply  
8 because there is no exposure scenario like that that  
9 could be practically studied. You know, a cohort of  
10 people with really low exposures, then you have to  
11 follow tens of thousands in order to have a  
12 statistical power to even see such a, you know,  
13 necessary, you know, increase in an epidemiologic  
14 study. So it's, you know -- no, those studies don't  
15 exist.

16 Q I hear you but didn't the two studies that  
17 you cite in this paragraph, the thorotrast ingestion  
18 study and the radium injection study, both lack  
19 statistical power because the sample sizes were so  
20 low?

21 A Well, they somewhat do which is why it was  
22 quite impressive that they saw these kinds of  
23 increases in cancer even though the expected numbers  
24 of cancer were relatively low.

25 Q And let me ask you this. Can you identify

1 any studies which on an epidemiologic basis find a  
2 statistically significant increase in kidney cancer  
3 occurrence at the levels of radiation -- I'm sorry of  
4 thorium and radium exposure calculated by Dr. Clark or  
5 lower?

6 MR. SOPER: Form and foundation. You can  
7 answer.

8 A Yeah, I'm not aware of any studies that even  
9 examine that particular question.

10 Q (By Mr. Beck) Thank you. So is this there --  
11 since you're just on general causation and it's part of  
12 your report, all you're trying to find out is is there  
13 some epidemiology out there that says to me, you,  
14 Dr. Hu, that exposure to some level of thorium and some  
15 level of radium can specifically contribute to an  
16 increased incidence of kidney cancer. Is that all  
17 you're able to state?

18 A It's more or less correct.

19 Q Now, let's turn to the section of your  
20 report on page 9 in which you discuss specific  
21 causation for renal cell carcinoma in Dr. Czapla. Do  
22 you see that section?

23 A Yes.

24 Q I'm interested in the second sentence after  
25 you set up the question and that is there is nothing

1 specific about cancer, its clinical presentation or  
2 its pathology, when it develops in an individual that  
3 definitely proves its cause. Have I read that  
4 accurately?

5 **A I think I said the word definitively which**  
6 **is slightly different.**

7 Q Thank you. Let me restate it. Do you say  
8 in your report here on page 9, there is nothing  
9 specific about cancer, e.g., its clinical presentation  
10 or its pathology when it develops in an individual,  
11 that definitely prove -- I'm sorry, I got that wrong  
12 again -- that definitively proves its cause. With  
13 that correction, am I right?

14 **A That's what I wrote. That's what I wrote.**

15 Q And that's -- correct?

16 **A I'm sorry?**

17 Q That's what you believe?

18 **A Well, I guess, you know, now that we're**  
19 **talking about it, the -- the possible exception is**  
20 **mesothelioma which is an aggressive form of cancer of**  
21 **the lining of the lungs for which almost all cases**  
22 **that have been reported have been related to asbestos**  
23 **exposure.**

24 Q All right.

25 **A There's a little bit of concern about some**

1 other, you know, pleural irritating exposures, but I  
2 would say mesothelioma is the one possible exception  
3 to that statement.

4 Q Okay. So except for mesothelioma, there's  
5 nothing about cancer when it develops in an individual  
6 that definitively proves it caused neither clinical  
7 presentation or pathology, correct?

8 A Correct. Well, now that I think about it --  
9 I'm sorry -- uh oh -- hold on. Okay. So, yes, there  
10 are some forms of cancer in which there are cytogenic  
11 tests which can identify what can be thought of as a  
12 genetic cause of cancer so I guess I should  
13 acknowledge that.

14 Q So let's get back to this case. There's  
15 nothing specific about Marc Czapla's cancer, his  
16 clinical presentation, or its pathology that de --  
17 that definitely proves its cause, correct?

18 A Right.

19 Q And there are also no tests that have been  
20 developed that can identify cause in that way,  
21 correct?

22 A Correct.

23 Q Is it fair to say that there are some  
24 questions of cancer where to a person of faith, the  
25 only person who can answer the question why did this

1     happen is the person to whom one prays?

2                     MR. SOPER:   Object to form.

3             **A     Is the person one -- what?**

4             Q     (By Mr. Beck) I'm sorry, you didn't -- if you  
5     didn't --

6             **A     Would you repeat the question?**

7                     MR. SOPER:   I don't think he heard you.

8                     MR. BECK:   Yeah, let me try again, Jonathan.

9             **A     Okay.**

10            Q     (By Mr. Beck) Thank you.   Dr. Hu, are there  
11   some cancers where no human can explain why they have  
12   it?

13            **A     Sure.**

14            Q     And where medicine, and toxicology, and  
15   epidemiology, and medical tests, and oncologists, and  
16   all of those folks just can't answer the question why  
17   this cancer happened that -- that can be true, right?

18            **A     Yes.**

19            Q     Now, I'd like to go to the next paragraph  
20   and I'm particularly interested in this.   You say  
21   methods have been developed aimed at quantitatively  
22   estimating the contribution to the causation of an  
23   individual's disease by an individual's exposure to an  
24   associated risk factors -- I'm sorry, risk factor  
25   single word -- they involve estimating probabilities

1 of causation and calculating measures such as the  
2 attributable fraction of risk associated with being a  
3 member of the exposed population. Could you explain,  
4 please, what that means as far as I read?

5       **A**     Well, I just want to signal that I'm aware  
6 that there are processes for trying to determine  
7 so-called probability of causation. They typically  
8 relate to federal efforts to understand the  
9 compensability of cancer on occasionally other  
10 outcomes in folks who are exposed to various things,  
11 and, you know, I wanted to acknowledge that those are  
12 out there, but, in fact, I don't think they're  
13 applicable to this case.

14       **Q**     I hear you. So, for example, if workers by  
15 reason of their work on behalf of the government were  
16 exposed to a specific radioactive exposures, there are  
17 some worker compensation programs that have a  
18 structure set up for estimating the likelihood that  
19 the exposure at work cause their cancer?

20       **A**     Yes, something akin to that is what these  
21 programs try to do.

22       **Q**     And how does that work? How does that  
23 assessment of the likelihood of causation or the  
24 probability of causation occur in those compensation  
25 schemes?

1           A     Well, it's typically some sort of  
2     calculation that's amounted that compares to  
3     probability of developing the outcome any way in  
4     relation to the probability of developing the outcome  
5     plus the exposure related probability as well. Those  
6     are some of the typical ways of getting at it. As far  
7     as I know, there's also quite a bit of literature in  
8     the legal and regulatory peer-reviewed scientific  
9     literature that, you know, takes these schemes and  
10    they're targeted towards federal employees to task and  
11    shows that, in fact, that's a gross over  
12    simplification of how to actually get at this issue  
13    of -- of, you know, attributable risk probability of  
14    causation. Regardless, you know, in my opinion, is  
15    just not an occasion which these are applicable.

16           Q     So have there been occasions when you as an  
17    evaluator have used this concept of attributable risk  
18    to compare the increment of risk from an exposure to  
19    the risk a person already had without the exposure?

20           A     Yeah. No, I have not served as a -- either  
21    an occupational physician or any of the expert review  
22    panels that have attempted to -- to apply these kinds  
23    of probability causation instruments in these  
24    situations.

25           Q     Are you saying you've never done that kind

1 of analysis in any case? I'm not referring to just  
2 compensation cases for federal employees. I'm saying  
3 have you never done a comparison of estimated risk due  
4 to an exposure as compared to the background risk an  
5 unexposed person would have had any way?

6 **A I may have done that in some of the asbestos**  
7 **litigation cases. I don't -- I don't actually know.**

8 Q And was that when you were acting in the  
9 capacity of an expert witness?

10 **A I think it might have been capacity of**  
11 **writing reports. I don't recall being deposed on that**  
12 **particular issue ever.**

13 Q I hear you but you were acting in the  
14 capacity of an expert evaluator?

15 **A Yes.**

16 Q And in expressing the opinions that you  
17 expressed in federal court, you express all of them to  
18 a reasonable medical and scientific certainty,  
19 correct?

20 **A Yes.**

21 Q And so at the risk of being accused of  
22 oversimplification, isn't it true that the increment  
23 of risk that Dr. Clark calculates for Marc Czapla from  
24 his alleged exposure to the Westlake Landfill is less  
25 than 1 percent of an average person's lifetime risk of

1 kidney cancer?

2 MR. SOPER: Object to form. Foundation.

3 A Yes. That is true, but it's -- again, it's  
4 based on using data that are based on average people.  
5 It doesn't actually take into account this person's  
6 age of onset, and as Dr. Clark says himself actually  
7 in the testimony he gave in deposition he believes the  
8 true exposure to be substantially higher.

9 Q (By Mr. Beck) And you're talking about what  
10 he claimed in deposition --

11 A Yes.

12 Q -- not in his report?

13 And you don't know what conversations  
14 Dr. Clark may have had with producing counsel off the  
15 record during that deposition?

16 MR. SOPER: Object to form. Foundation.  
17 That's an improper question.

18 Q (By Mr. Beck) If any?

19 A No.

20 Q If he had any, you don't know it?

21 A I don't know.

22 MR. SOPER: Same objection.

23 Q (By Mr. Beck) And, Dr. Hu, just to help us  
24 make that comparison, though, in the terms that you  
25 think are more appropriate, you didn't conduct an

1 analysis of the risk of contracting kidney cancer by  
2 age 47 in a person to compare to the risk calculated by  
3 Dr. Clark with respect to Marc Czapla, correct?

4 Correct, you did not?

5 **A No.**

6 Q All right. Let me get out of your report  
7 and back into my notes so I can ask my next question.  
8 Give me a second, please.

9 MR. SOPER: Bill, just so we're on the same  
10 page, we're coming up to our break for the day.

11 MR. BECK: That's fine. We're breaking for  
12 your convenience and I'm happy to do it. I just --  
13 we'll -- we'll all get a count from the videographer  
14 or reporter after the deposition how much of our time  
15 we used on the record.

16 MR. SOPER: Okay. That's fine. Just --  
17 just want you to be aware that 1:00 Pacific time we'll  
18 be -- we'll be breaking.

19 **A Yeah. I thank you for that.**

20 Q (By Mr. Beck) And in order to do that, let  
21 me -- actually ask my next question. I'm still on the  
22 bottom of page 9 and then carrying over to the top of  
23 page 10 of when your report Dr. Hu. You state,  
24 however, as with most cases of cancer induced by  
25 federal regula -- making precise such estimates is not

1 possible, and then you express certain uncertainty.

2 Have I read that accurately?

3 **A Yes.**

4 MR. SOPER: Object to form.

5 Q (By Mr. Beck) And on the top of page 10, one  
6 of the uncertainties that you identified is limited  
7 knowledge of the shape of the dose response curve  
8 relating exposures to thorium and radium and renal cell  
9 carcinoma; is that true?

10 **A Correct.**

11 Q And that's -- that's an important  
12 uncertainty in this case, isn't it?

13 **A It is an uncertainty.**

14 Q And when you refer to the shape of the dose  
15 response curve, you make the assumption in your report  
16 that exposure to thorium and radium causes a linear  
17 increase in kidney cancer risk with no threshold below  
18 which there's no added risk, right?

19 **A That is an assumption based on the same**  
20 **assumption being made authoritative bodies like as we**  
21 **said before the bile -- the BIER committee --**

22 Q I hear you.

23 **A -- the International Agency for Research on**  
24 **Cancer, et cetera.**

25 Q Thank you. But going to on what you said on

1 page 10, you acknowledge that we don't know the actual  
2 shape of the dose response curve relating exposures to  
3 thorium and radium with renal cell carcinoma. That's  
4 one of the uncertainties in this case, correct?

5 A Correct. I mean, shape could be linear, but  
6 you don't know what the slope is. I mean, that's  
7 another, you know, aspect of it. It's unclear.

8 Q You don't know the slope and you don't know  
9 whether or not there's really a threshold because  
10 nobody's got a study that answers that question so  
11 far, correct?

12 MR. SOPER: Object to the form. Misstates  
13 testimony.

14 A Well, as I said before, there's basically  
15 the scientific experts believe there is no threshold  
16 that -- that -- well, you know, the slope calculations  
17 still in question.

18 Q (By Mr. Beck) Are you saying scientific  
19 experts believe there's no threshold or assume there's  
20 no threshold?

21 A It's a little bit of both. I mean, the  
22 epidemiology that tries to assess whether there's a  
23 threshold, and as far as I know is not been able to  
24 find one, and that's, you know, part of it because  
25 it's a limitation of epidemiology. You need a

1     **fantastically large sample size in order to explore,**  
2     **you know, whether there's a threshold below a certain**  
3     **amount of radiation. So it's -- it's just not**  
4     **possible to do wherever. They look for one, they**  
5     **haven't found it.**

6           Q     And that's why the threshold question  
7     remains uncertain today, right?

8           MR. SOPER: Misstates testimony.

9           Q     (By Mr. Beck) Isn't that true, sir?

10          A     **I guess you could say some uncertainty about**  
11     **it.**

12          Q     And then I want to go to the last part of  
13     that sentence, one of the uncertainties you describe  
14     is -- I'm going to quote -- the -- the precise  
15     quantitative amounts of Dr. Czapla's exposure to  
16     thorium, radium, and other radionuclides. Have I read  
17     that accurately?

18          A     **Yes.**

19          Q     And that's an uncertainty?

20          A     **Yes. I mean, you know --**

21          Q     And -- and that's uncertain because it  
22     depends on two things. One, it depends on Marc  
23     Czapla's description of the frequency and duration of  
24     his exposure being accurate, and second it depends on  
25     the estimate by Dr. Clark actually described --

1 describing reality as opposed to assumption; is that  
2 fair?

3 MR. SOPER: Object to form.

4 **A That's fair enough.**

5 MR. BECK: If it's okay with you and  
6 Jonathan, I'll go ahead and break at this point just  
7 because it's a good stopping point, and we're close  
8 enough to 1:00 o'clock Pacific to be almost there, and  
9 we'll just pick up tomorrow morning at 9:00.

10 MR. SOPER: Bill, he does have a hard cutoff  
11 at 2:45 Pacific time tomorrow.

12 MR. BECK: I hear you.

13 MR. SOPER: I don't want to produce him for  
14 a third day. So you tell me if you think 9:00 to 2:45  
15 is going to give us enough time. If not, you might  
16 want to start a little bit earlier. I think it will  
17 but --

18 MR. BECK: How about starting at 8:00  
19 Pacific instead of 9:00 Pacific. Is that okay with  
20 you, Dr. Hu?

21 THE WITNESS: Hold on. Let me check my  
22 schedule.

23 MR. BECK: Thank you.

24 VIDEOGRAPHER: Do we want this on the  
25 record, or do we want to go off to record?

1 MR. BECK: No, let's leave it on the record  
2 for now.

3 VIDEOGRAPHER: Okay.

4 MR. SOPER: I mean, Bill, even if we start  
5 at -- at 9:00 that's, what, five hours and 45 minutes?  
6 How much time have we done today on the record?

7 MR. BECK: I don't think we have that  
8 calculation yet, but let's give ourselves some comfort  
9 zone. I don't want to come back a third day.

10 VIDEOGRAPHER: This is the videographer.  
11 We -- we're getting close to three hours and 20  
12 minutes of -- of on-the-record time.

13 MR. SOPER: I think that's plenty of time if  
14 we start at 9:00 tomorrow. I mean, that's -- That's  
15 five hours and 45 minutes so that's over nine hours, I  
16 think, total if we go all day with no breaks so --

17 MR. BECK: Yeah. I was just trying to give  
18 a little extra room in case you had any questions,  
19 Jonathan.

20 THE WITNESS: You know, I can start at 8:00.

21 MR. BECK: Thank you. Let's start at 8:00,  
22 and then hopefully we'll finish much earlier than we  
23 planned to. Okay with you, Brian?

24 MR. WATSON: That works.

25 MR. BECK: All right. We can go off the

1 record. Thank you very much. Talk to you all in the  
2 morning.

3 VIDEOGRAPHER: Going off the record at  
4 2:55 p.m.

5 (Whereupon signature was reserved, and  
6 the deponent was excused.)

7 (The exhibits were retained by the  
8 court reporter.)

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1 COMES NOW THE WITNESS, DR. HOWARD HU, and  
2 having read the foregoing transcript of the deposition  
3 taken on the 31st day of AUGUST, 2020, acknowledges by  
4 signature hereto that it is a true and accurate  
5 transcript of the testimony given on the date  
6 hereinabove mentioned.

7 \_\_\_\_\_  
8 [DR. HOWARD HU]

9  
10 Subscribed to before me this \_\_\_\_\_ day  
11 of \_\_\_\_\_, 2020.

12 \_\_\_\_\_  
13 [Notary Public]

14 My commission expires: \_\_\_\_\_.

15  
16  
17 (DR. HOWARD HU VIDEO CONFERENCE AND TELEPHONIC  
18 VIDEOTAPED DEPOSITION)  
19 MARC CZAPLA AND JILL CZAPLA vs. REPUBLIC SERVICES,  
20 INC., ET AL.  
21 Reporter: Angela M. Taylor, RPR, MO-CCR, IL-CSR  
22 Date Taken: AUGUST 31, 2020.  
23  
24  
25

REPORTER CERTIFICATE

I, Angela M. Taylor, RPR, MO-CCR, IL-CSR, do hereby certify that there came before me at video conferencing and telephonically remotely,

DR. HOWARD HU,

who was by me first duly sworn; that the witness was carefully examined, that said examination was reported by myself, translated and proofread using computer-aided transcription, and the above transcript of proceedings is a true and accurate transcript of my notes as taken at the time of the examination of this witness.

I further certify that I am neither attorney nor counsel for nor related nor employed by any of the parties to the action in which this examination is taken; further, that I am not a relative or employee of any attorney or counsel employed by the parties hereto or financially interested in this action.

Dated this 8th day of SEPTEMBER, 2020.

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ANGELA M. TAYLOR, RPR, MO-CCR, IL-CSR

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